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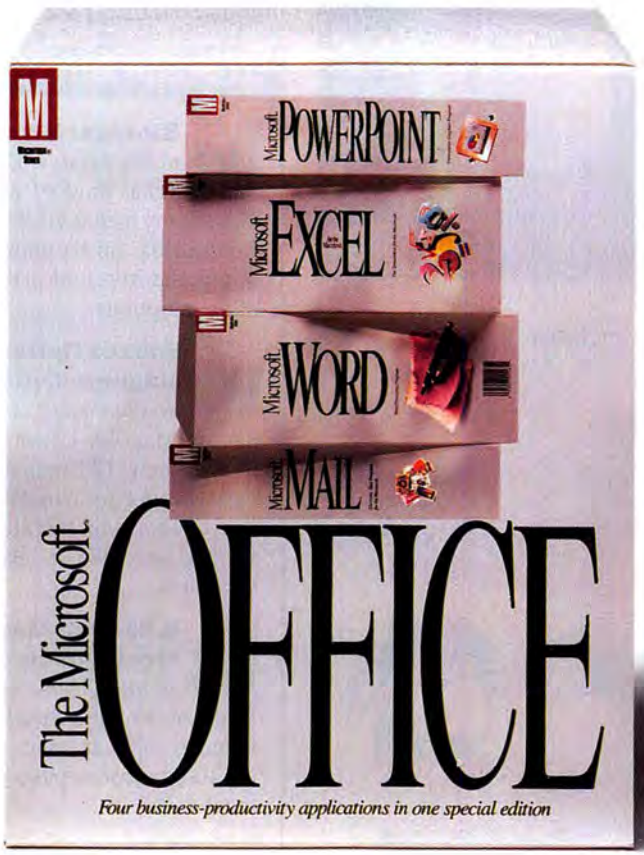
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JULY 1992

Volume 8 Number 7

On the cover: Storage comes in all sizes, capacities, and prices. This month's Buyer's Guide cuts through the complexities of choosing.
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49
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Buyer's Guide 10
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203
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Features

Chart Stars
BY RON HIPSCHMAN
Your spreadsheet program might make the charts, but a dedicated charting package is No. 1 with a bullet. Check out these four chart toppers. **92**

The Reference Shelf
BY KEN GRUBERMAN
Can the latest crop of word-processing companions — electronic encyclopedias, dictionaries, style guides, quotation compilations, and thesauri — rival, surpass, eclipse, or transcend their paperbound predecessors? **100**

Storage Buyer's Guide 111

Storage: What to Buy, What to Pay
BY RIK MYSLEWSKI
What kind of mass storage do you need? How many megabytes? What should it cost? Get the bottom line on bargain bytes for the buck in this comprehensive look at the latest generation of mass-storage options. ..... **Buyer's Guide 4**

Pocket Opticals: 3.5-Inch Magneto-Optical Drives
BY MARK FROST, JOHN RIZZO, AND THE MACUSER LABS STAFF
With a new 128-megabyte optical cartridge, you can slip a portfolio of data into your pocket. We test-drove ten 3.5-inch optical drives to see if this new format has what it takes to beat the established standards. ..... **Buyer's Guide 10**

5.25-Inch Magneto-Optical Mechanisms
BY MARK FROST AND THE MACUSER LABS STAFF
Prices are down and performance is up for 5.25-inch magneto-optical drives. We assess the strengths of the three most popular 5.25-inch magneto-optical mechanisms. ..... **Buyer's Guide 31**

3.5-Inch Gigabyte Hard-Disk Mechanisms
BY MARK FROST AND THE MACUSER LABS STAFF
Three-and-a-half-inch gigabyte hard-disk mechanisms are small but speedy enough to compete with the heavyweights. ..... **Buyer's Guide 37**

Supercharging the SCSI Bus: SCSI-2 Cards
BY KELLI WISETH AND THE MACUSER LABS STAFF
Your ultrafast hard drive won't do you much good if your Mac's data-transfer capabilities can't keep up. Here's how four speedy SCSI-2 cards pumped up the throughput. ..... **Buyer's Guide 42**

Sections


NEW ON THE MENU 45

A special preview of the fastest Mac yet, the Quadra 950. Plus: System 7 Tune-Up gets a tune-up, practical voice input for Macs gets one step closer, Apple gets a little greener, and more. 45


DESKTOP PUBLISHING 171

Prepress
How to shake off the vertigo of moiré and get good-looking halftones every time. 173

Step by Step
New pressure-sensitive painting tools blur the distinction between computer-produced art and naturally produced art. 184


BRIDGES 187

Platforms
Saving dot-matrix printers from getting relegated to the dustbin of history. 193


PERSONAL MACINTOSH 203

Personal Best
Recommended reading from Bobker's bookshelf. Plus: the best PowerBook-battery tips ever and the Easter eggs of the month. 205

Shopping List
Essential tips for buying CD-ROM drives. 216


POWER TOOLS 217

Techniques
How it works: a visual guide to the workings of integrated software. 218

Beating the System
Bob LeVitus' patented, easy 30-minute four-step system tune-up. 221

Tip Sheet
How to master Microsoft Word 5.0, Excel 3.0, the Finder, WordPerfect, FrameMaker, the PowerBook Battery, and more. 225

Help Folder
How to start a floppy-disk-recycling program, hush a noisy drive, address 32 bits, and play footsie with PageMaker. 234

Zmac
Free! A custom mass-storage-advice stack. 241

Reviews

MUSE
A hybrid spreadsheet/database tool that lets you manipulate data in flexible and surprising ways. 52

Cinemation
Build animated presentations easily. 54

PageMaker 4.2 and **QuarkXPress 3.1**
Imitation looks like the sincerest form of competition in the latest round of the DTP page-layout battle. 56

StrataVision 3d
This 3-D-design package's new modeling and rendering tools put photo-realistic images within your grasp. 58

WordPerfect Office
WordPerfect Office ups the ante for mail packages. 70

VideoSpigot
A low-cost video-capture board for QuickTime. 74

Now Up-to-Date
Juggle your personal and group schedules. 76

Quick Clicks
MacGlobe: Electronic atlas and almanac. **MasterJuggler** and **Suitcase II:** Natural resource management. **MultiPort** and **QuadraLink:** Reduce cable clutter. **AutoDoubler:** Fast, automatic file compression. 85

Departments

Jon Zilber
How you can help Apple help you. 23

Guy Kawasaki
Guy says goodbye. Sigh. 29

Michael Swaine
How to save HyperCard. 41

John C. Dvorak
Mr. Bill goes to court. 324

Letters
Readers call on Casper, recycle SIMMs, and decode Apple appellations. 13

Advertiser Index 248

Marketplace 296

"The pundits who promised there'd be a CD-ROM drive on almost every desktop may soon be proved right." 216

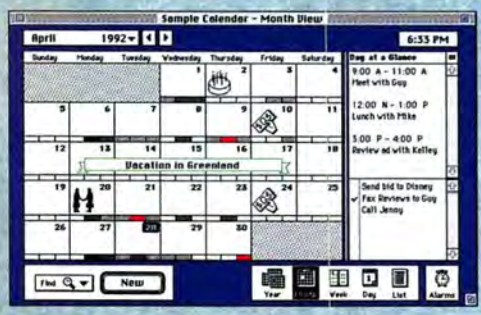


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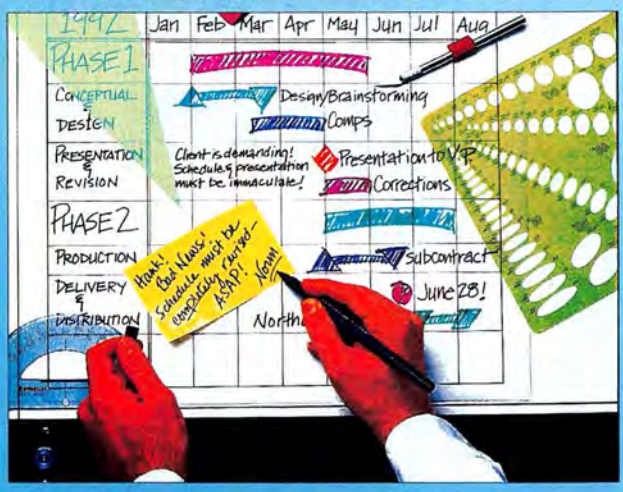
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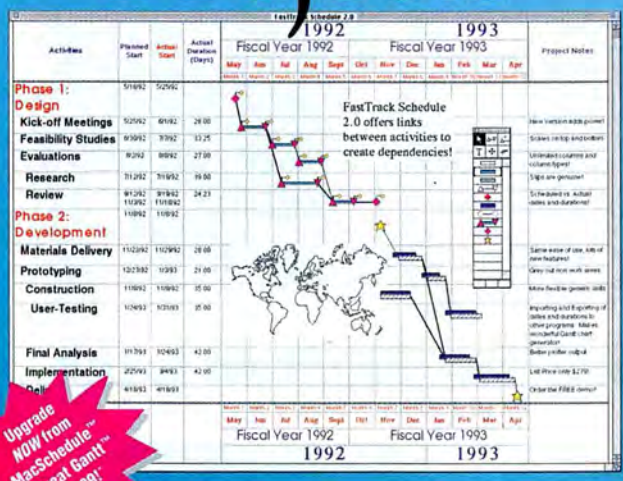
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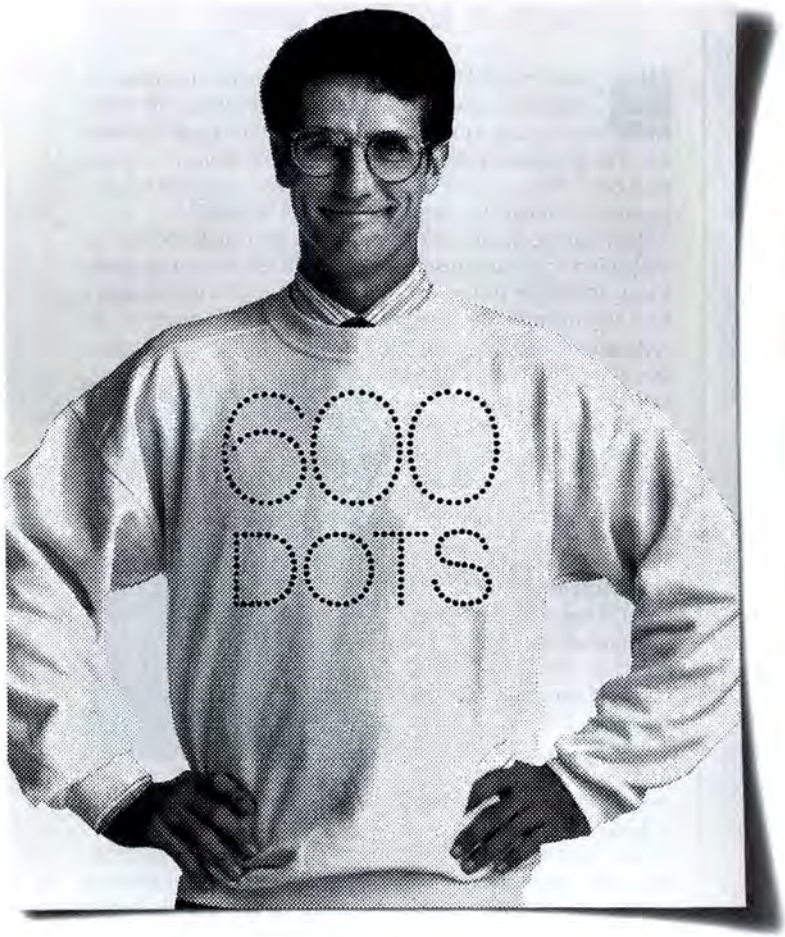
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About MacUser

Perfect Penmanship

Behind every *MacUser* lab report stands a mountain of paperwork: checklists of product features, lab notes, benchmark data, and calculation results. Typically these items are recopied or rekeyed several times on their way to their final destinations — the performance charts, scatterplots, feature tables, and mouse ratings you read each month.

This month, throughout the lab tests we conducted for our evaluation of 3.5-inch magneto-optical drives, we were actually testing more than just optical drives; we were also test-driving a new way of collecting test data. In a pilot evaluation study, we replaced our usual system for collecting data with a custom-designed pen-based input system.



Project leader Jeffrey K. Milstead goes by the pen name of Jeffy.

The test platform was a prototype 286-based GO Corp. machine running beta versions of GO's PenPoint operating system and Slate's PenApps, an application-development system, with a specialized electronic implementation written for *MacUser* by Young Ideas' Cathy Young and Genelle Cate.

Using a special pen, MacUser Labs technicians checked boxes directly on the screen, rather than on paper forms, and hand-printed performance times into screen fields. Once the numbers, letters, and check boxes had been filled in, the rest of the rating process was highly automated. Performance times, for example, were output in tab-delimited format to a DOS floppy disk and then loaded into Excel on a Mac. The Excel data was ultimately translated into the graphs that appear in our performance charts.

The benefits of using the pen-based system were spectacular.

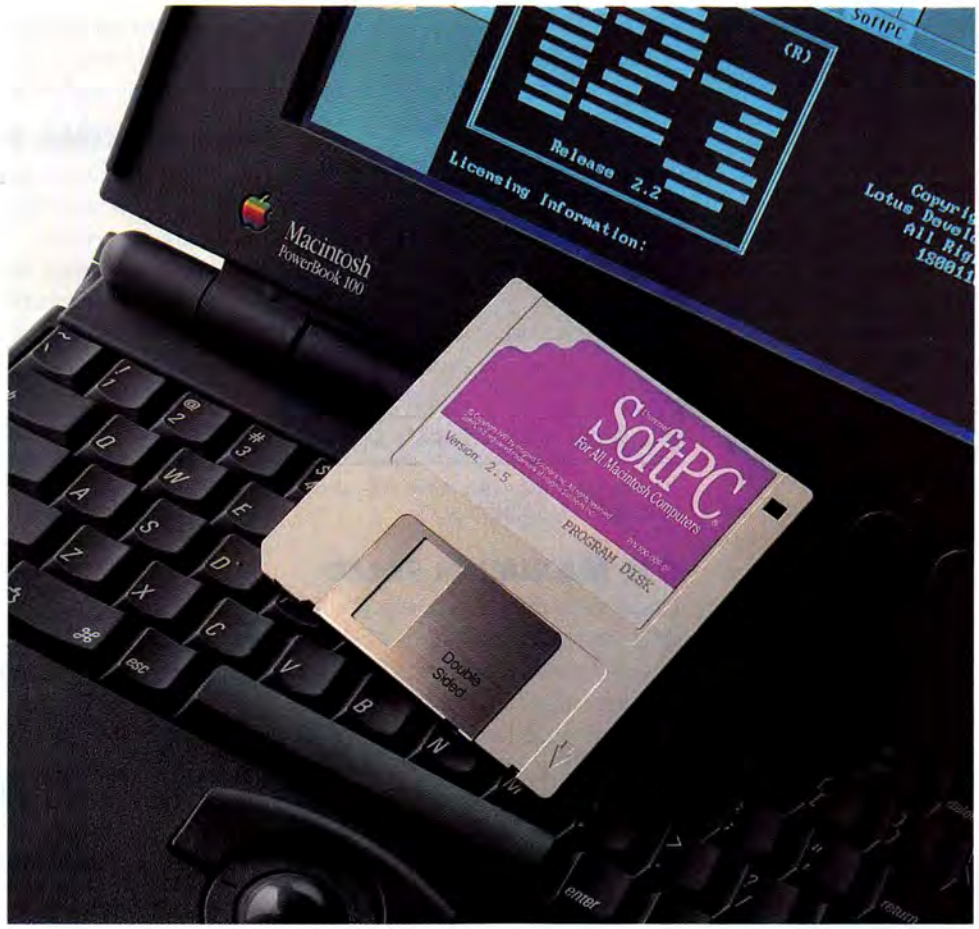
The system cut short our evaluation time (despite several system crashes). Besides eliminating nearly all manual copying of data, it prompted the technicians for the next step in the process, so they didn't have to refer to notes or track down a supervisor. If we had spent as little as an hour per person to train the system to better recognize each technician's writing, we could have boosted our performance even more.

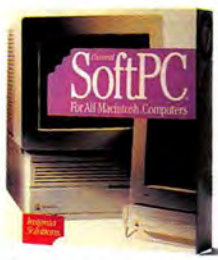
The system helped us turn subjective values into objective data. Performance attributes that had formerly been cited as "pretty good" or "OK" received a precise numerical value from the outset. If repeated tests gave widely varying results, the system prompted the technician to run more tests.

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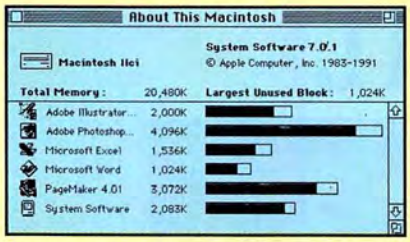
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CIRCLE 152 ON READER SERVICE CARD.

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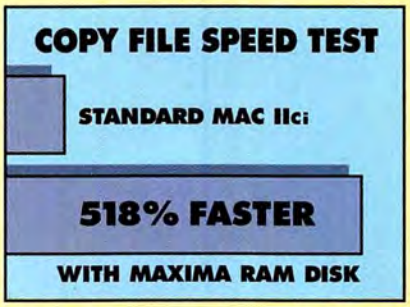
Few people know that the Mac's System usually lets you access only 8 megabytes of RAM for running programs. *Even if you have much more memory installed.*

That means you may only get half an upgrade when you buy 4 megabyte SIMMs.

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Maxima is a must when using System 6 and for avoiding 32-bit addressing incompatibilities in System 7.

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Maxima's RAM disk makes many disk-intensive functions exceptionally fast.

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* Maxima works with Macintosh models IIci, IIsi, IIcx, IIx, IIfx, Mac II w/ PMMU, SE/30, Quadra 700 and 900.

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CIRCLE 62 ON READER SERVICE CARD.

LETTERS



Sam Dwarkanath of Warren, New Jersey, is suffering from future shock. "I just spotted something horrible in the March issue! Your vision of the Mac 2000 (page 131) has a monitor that's smaller than the Classic's! And what's that printer, a LabelWriter!? God forbid that a Mac has a 2-inch screen and printer!"

Alas, Sam, the smaller the machine, the smaller the screen. A truly portable — even wearable — computer requires some sacrifices. Of course, input won't be a piece of cake either. That's why we need Casper, the friendly host (see the "Say What?" letter on this page).

✉ *Write to Letters to the Editor, c/o* MacUser, *950 Tower Lane, 18th Floor, Foster City, CA 94404, or post your letter on the MacUser Forum of ZiffNet/Mac (also known as Zmac), our on-line service.*

All letters become the property of MacUser, *and we reserve the right to edit any letters we print. Please include a return address and a daytime phone number.*

Say What?

As usual, Jon Zilber wrote something worth reading ("Three Little Macs," April '92, page 23), but I have misgivings about voice input as a substitute for the keyboard. There is simply too little control over ambient noise — that is, any sound not deliberately addressed to my computer. Imagine this scenario:

I'm flying home from the 1993 MacSochism Conference. I've spent three hours and two batteries on my trip report. Suddenly the overhead speaker blurts, "Hello, folks. This is Captain Nemo. It's a really clear day for flying. Clear, clear, CLEAR!"

And my PowerBook's screen goes blank, and the report is wiped out. Fortunately, I've saved the file. My sympathetic neighbor leans close and says, "Well, at least he didn't say 'Erase the hard drive.'" Click, whirr . . . .

Jon has the right idea — using voice to augment a clever system of menus — but clearly the opportunities for doing it wrong are extensive.

Paul F. Doering
Rochester, NY

Not to worry. In Apple's demonstrations of the Casper voice interface, the system requires that you begin commands by addressing it by name ("Casper, erase the hard drive") to prevent just this kind of disaster. You might feel self-conscious, though, if your name happens to be Casper. — JZ

Shareware Goodies

In your excellent article "Graphics Glossary" (April '92, page 165), you mention Adobe Photoshop and its ability to import and export a variety of graphics file formats. Kevin Mitchell's shareware utility, GIFConverter, can do much the same thing for just $40. You can use it to view, save, and print Paint, PICT, EPS, TIFF, RIFF, GIF, ThunderScan, RLE, and Startup screen files. GIFConverter also has more-technical details on the various formats than are included in your article.

Charles A. Reeves, Jr.
Knoxville, TN

Sheesh! In your strategies for using large monitors ("The Big Screen," April '92, page 206), how could you overlook Mason Lancaster's great shareware utility, Scroll2? It puts two arrows at each end of a scroll bar — nice for any size screen but *essential* for a big-screen monitor. You only have to move the cursor a quarter of an inch to switch from scrolling up to scrolling down. Ditto for left and right scrolling.

Robert C. Leedom
Glenwood, MD

Thanks for the reminders. Both utilities are available in the Download & Support Forum of ZiffNet/Mac, MacUser's *on-line service. GIFConverter is GIFCON.CPT in Library 1 (Applications); Scroll2 is SCROL2.SIT in Library 3 (INITs, Cdevs, FKEYs). — AA*

On the last page of "The MacUser 100" (December '91, page 129), the eight shareware and freeware offerings are referred to as "public-domain software."

"In the public domain" refers to anything that is not protected by copyright or patent and that may be used, sold, or appropriated by

Dear Mr. Sculley . . .

QuickTime is this year's hottest technology, but does Mac video have practical applications for the average user or is it just hype?

Speak Up:
What are the best — and worst — uses you've seen of QuickTime?

In April '92, we asked what **consumer electronics** you'd like to see with the Apple logo. Kris Hill of Petaluma, California, had a pressing need: "Do you even have to ask? VCRs! I won't buy a VCR until they have an intuitive GUI!"

Several readers clamored for a chord-based portable note taker. Joe Sandoval of Elkview, West Virginia, is clearly pining for such a gadget. He sent us a wooden prototype of his vision, a supercharged GameBoy, along with a complete set of specs. "I call it a MacMan. I envision a device 7 inches wide by 10 inches high. At the top is a backlit LCD screen. At the bottom are two recessed areas for your thumbs. You twitch one thumb to move the cursor and the other to select an item.

"The QWERTY keyboard is an impossible interface for a portable computer, so MacMan has four keys placed along each side of the back, where the fingers are naturally placed when you grip it with both hands. By pressing combinations of the eight keys (chording), you can reproduce every keystroke on a normal keyboard. This could be the most significant user-interface change in decades. Apple could bundle a tutoring program to teach people how to use this novel keyboard.

"Finally, give the MacMan 4 megabytes of static RAM; a hard drive; and ports for a floppy drive, a printer, and LocalTalk. Price it less than $300, and I bet every college student will be begging for one to take notes."

Nifty idea, Joe. Until the MacMan becomes a reality, we suggest a low-cost, pen-based alternative. It's called a notepad, and it retails for about $1.25 (pen included).

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anyone. So, if Microsoft liked a nifty text processor that you wrote and released specifically into the public domain, it could put its copyright label on the program and sell it with Word.

Shareware — software for which the author expects payment after a trial period — is obviously not in the public domain. Although freeware programs require no payment, they are always copyrighted unless specifically released into the public domain by the authors. (Under federal copyright law, anything you create is protected once it's in "readable form," be it on disk or on paper, unless you specifically waive your rights to it.)

Garner Miller
Reston, VA

Visual Reality

Andy Ihnatko left out a big player in the visual-programming arena in "Let's Get Visual" (April '92, page 213). For the past four years, I've been programming in a purely graphical way by using National Instruments' LabVIEW. Contrary to the comments in your article, creating complex visual programs that run as fast as compiled C is quite possible. Indeed, they can be created and debugged more quickly by using LabVIEW. This application fits very nicely into my arcane world of engineering and science on the Mac.

David A. Moschella
Boston, MA

LabVIEW is a spiffy product, Dave, and if you want to write software that checks the fluctuations in a phased-ion chamber, LabVIEW is No. 1. But most folks want to create common, widely used applications that will make them multimillionaires. That's where Prograph and Serius Programmer come in. — AI

Simulated Science

I enjoyed Michael Swaine's February '92 column ("Newton's Virtual Apple," page 37), despite two errors. He claimed that Allen Newell's Soar architecture for artificial cognition doesn't run on the Mac yet. This is untrue. Soar is LISP-based and runs on any machine that runs Common LISP.

Newell's a smart guy, but his theory of cognition is far from being the first candidate for a unified theory of cognition, as Swaine claims. I'd give the credit to Aristotle, who wasn't right in detail (in fact, he didn't even figure out that the brain was involved in cognition), but I'm willing to bet that Newell isn't right in detail either.

Chris Westbury
Montreal, Quebec
Canada

In his February column, Michael Swaine says, "What is needed are programming environments for people who are not professional programmers, and to make these work, software must become more modular." Extend, from Imagine That!, is a good example of an open-ended simulation environment. The software's modular library organization allows people to concentrate on a problem, not the method or language of describing a problem.

Simulation is not limited to scientific studies. At the Educational Testing Service, Extend's built-in libraries and visual-programming approach have let us model business situations in a way that would have been impractical by other means, such as using a spreadsheet program. Our use of Extend has also given us insights into how to run things more efficiently.

Paul SooHoo
Princeton, NJ

Memory Loss

With the advent of System 7, there's very little use for the 1-megabyte Mac. The once-ubiquitous 256K SIMM chips are now as useless as side pockets on a toad, and they eventually find their way into the trash. We're cluttering the environment with these relics. Do you know where to send these fine memory modules, so they can be used for their intended purpose?

Lionel H. Layton
Brigham City, UT

A quick poll of the MacUser *staff revealed that the most popular use for antiquated 256K SIMM chips is jewelry — earrings, brooches, barrettes, and tie clips. Other recycling efforts include bookmarks, Christmas tree ornaments, high-tech mobiles, coasters (in sets of four), table levelers, box openers, and fishing lures (for when they're really byte-ing).*

For a more practical approach, Computer Care (800-950-2273 or 612-371-0061) offers two products for reusing 256K SIMMs. Owners of the Mac II, IIx, IIcx, and IIci can use Softstep III ($19.99) to transform four SIMMs into one large memory unit that occupies a single SIMM socket on the Mac motherboard. You can

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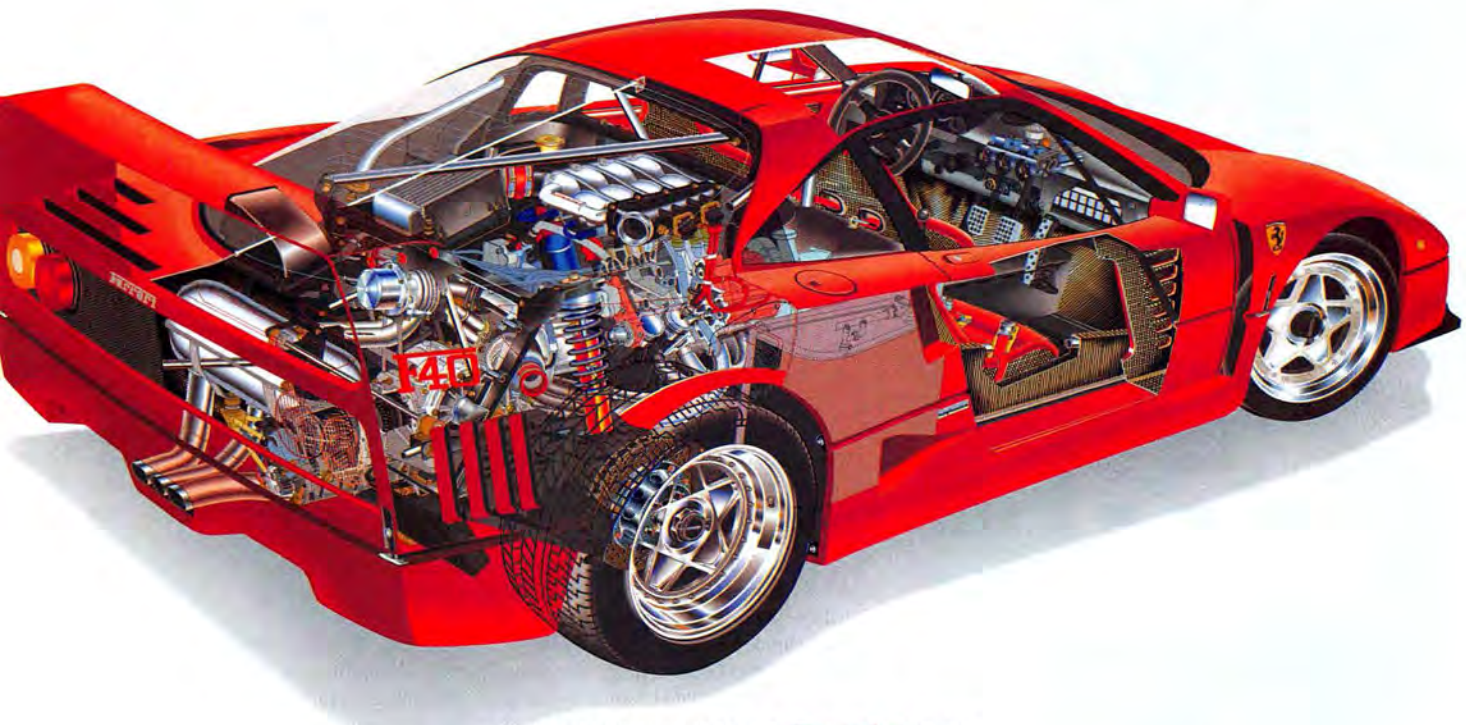
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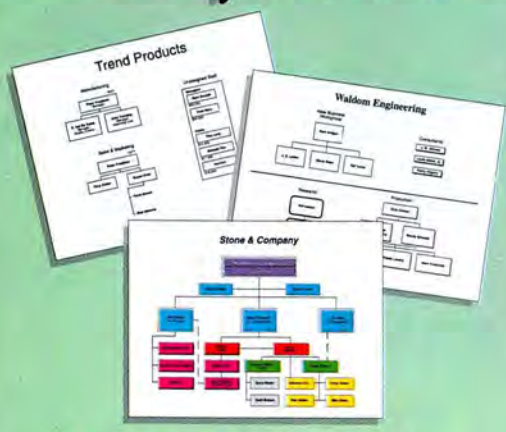
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CIRCLE 98 ON READER SERVICE CARD.

LETTERS

also resuscitate a 128K or 512K machine with the Mac Rescue board ($249), which gives these moldy oldies six more slots for 256K SIMMs. — AA

More on Model Names

In response to Keith Luscher's letter in the April issue ("Apple's Alphabet," page 18), you said that according to Apple, the letters in the names of Mac models don't stand for anything. You then added that *MacUser* rumor suggests that *c* stands for compact and *i* for internal video. Let me add the following conjectures:

•*s* probably stands for single slot, because the IIsi has only the one PDS.

•*x* means the CPU uses a 68030 chip. This code was used prior to Macs with *is*.

•*f* means fast. The IIfx was the fastest Mac and has a 68030 processor.

Thus, the IIcx is a "68030 in a compact case"; IIci means "compact case with internal video"; and the IIsi is a Mac with a "single slot and internal video."

Furthermore, *L* means low cost and *C* stands for color. Put them together, and you've described the Mac LC. The four in 68040 is consistent with the quad in Quadra, and it conveniently avoids the dreaded word *three*.

SE stands for system-enhanced. The SE/30 was aptly named because it was an SE with a 68030 processor. I guess it was beyond Apple's marketing strategy to use the name Macintosh SEx!

Robert Otani
Chino Hills, CA

Selling (Out) the Dream?

When I first met Guy Kawasaki (at a user-group meeting), he was the ultimate evangelist. He sold the dream of Macintosh — not the computer but the untapped abilities of the average person that were realized through use of the Mac. In his book *The Macintosh Way*, I found helpful tips that I applied to my consulting business; in fact, *The Macintosh Way* led me to start that business in the first place!

A year or so later, I noticed that Guy was appearing in more advertisements, recommending a lot of products. "More power to him," I figured.

But soon afterward, his *MacUser* columns seemed to have almost nothing at all to do with the Mac. Guy was no longer an old-fashioned Macintosh evangelist — supporting things because they were great, not because he was paid to say they were.

To my amazement, Guy's February '92 column actually had something to do with Mac users. "Masters of Macintosh" (page 33) almost recaptured the lost Kawasaki flame. In his March column ("Help!", page 29), he again almost redeemed himself as a real evangelist, right up to the very last sentence, when he seemed to grab me by the shirt and say, "Hey! I get paid to evangelize now! I am popular. I am rich. I don't have time to deal with you any more."

Come on, Guy. Get off the soapbox and give us unpaid evangelists what we want most from our leader — the old Guy Kawasaki!

David Pipgras
Vancouver, WA

The good news is that the old Guy Kawasaki is back. The bad news is that this month's column marks his farewell. Guy has decided to concentrate on product evangelism and his next book (which, although it might have little to do with Macintosh, the computer, will surely keep alive the spirit of Macintosh, the Way). We'll miss him greatly, and we wish him success with both endeavors. — JB

Dvorak's Class Act

John C. Dvorak writes that "the Apple II won't get junked until educators figure out that they're apparently the only group in the country that isn't benefiting from computer technology" ("Failing Grades," February '92, page 372). Perhaps he's unaware of the funding crisis in education. Perhaps he's unaware of how long and hard educators have travailed to get the necessary funds to buy those antiquated machines, with endless candy sales, magazine drives, and pizza nights. Perhaps he's unaware of how educators struggle to transform outmoded materials into productive experiences for children.

When Apple withdrew its support from the Apple II, it became just that much harder for educators to use what meager equipment they had to provide quality instruction.

The fault, Mr. Dvorak, lies not with the educators who always struggle to make do with less but with the legislators who fail to fund education and the public that fails to demand quality instruction.

Rebecca Ann Penso
Los Angeles, CA

John C. Dvorak's column about education is totally out of date with what's happening at Ouzinkie School, located on Spruce Island in the Gulf of Alaska. Ouzinkie is an isolated community, and

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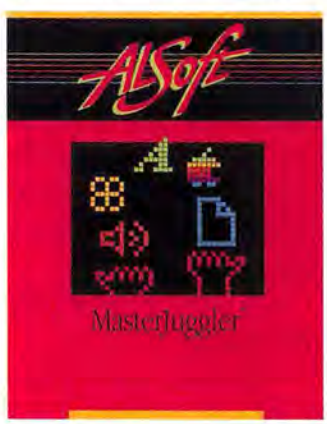
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the school has only 42 students in grades K–12. Yet we are making extensive and practical use of computer technology.

Each morning, it's not the ring of a bell but the chime of a Macintosh that signals the start of a new day. We have several Macs, and students use them for many tasks, including bookkeeping, journalism, electronic photo editing, math drills, current events (using AP wire sources) — even plain ol' homework assignments. Students learn the intricacies of on-line services and research techniques, accessing libraries and databases across the country. Elementary students prepare a weekly radio program on the Mac and have E-mail pen pals. We teach Spanish using Señor Mac. My office computer is a Mac, which stores records and keeps me in touch with my two other schools.

In short, we are not the backward, slow-moving school you describe in your column. Instead of griping about the lack of funding, we realized our computer dreams through local, state, and federal grants. When we win more grants, we hope to acquire the equipment to do a video yearbook and to learn about music via MIDI.

Robert Boyle, Principal
Ouzinkie, AK

The Mac Is Not a Ferrari

As a member of the Ferrari Club of America since 1969, I was intrigued by John C. Dvorak's column equating Macs with Ferraris ("The Ferrari Phenomenon," March '92, page 308).

Mr. Dvorak seems to have misunderstood how the Ferrari company operated during Mr. Ferrari's lifetime. Unlike Porsche, whose main product was sports cars for the public, Ferrari's main product was racing cars. Street-automobile production was never really important to the Ferrari factory, so most hardware on their street models was cheap mass-produced stuff. File and hammer markings were clearly evident, and paint wouldn't hold to the uneven bodywork. When a Ferrari's body rotted off, you ordered up a replacement or had a new one built. Many older Ferrari engines are now on their third or fourth body.

If John Sculley really wants to emulate Ferrari's success, he should do as Mr. Ferrari did: Use cheap, disposable, fragile components; make Macs difficult to use and operate; price them exorbitantly; and keep the same CPU for 20 years.

Sandy Untermyer
Moodus, CT

Mirror, Mirror

Although I found John C. Dvorak's April column (page 322) to be pretty "flipped out," it failed to be a real inconvenience. By using a scanner, I was quickly able to straighten things out. Nice try, though.

Paul Lucchese
Hopewell Junction, NY

I did not attempt to read John C. Dvorak's April column, because it was apparent he didn't care if we read it or not. This is the kind of thing I would expect from a grade-school child, not a professional magazine. I have not been a subscriber for very long, but it is bad enough putting up with Dvorak's "big machine" ideas without having to put up with this nonsense.

David G. Smart
Alva, OK

Then you missed the part where I talked about you (paragraph 6). — JCD

I enjoyed John C. Dvorak's April Fools' column. I read the whole thing backward — it took 25 minutes, the longest time I've ever spent on his column.

Karen S. Hammond
Ellicott City, MD

If John C. Dvorak thinks the Macintosh is "a weenie computer," he is backward and needs to be turned around.

Steven M. Bermisel
Logan, UT

Clarifications

The new address and phone number for Pastel Development, maker of DayMaker (Quick Clicks, May '92, page 71), are 113 Spring Street, New York, NY 10012; 212-941-7500.

The correct toll-free phone number for inquiries about Microsoft Excel 4.0 ("Excel 4.0 Blazes Ahead," May '92, page 42) is 800-426-9400.

The Kodak Ektaplus 7016, listed in the directory on page 62 of the May '92 "Color Buyer's Guide," is actually a monochrome laser printer.

The telecommunications program ZTerm, mentioned in "Have Data, Will Travel" (May '92, page 187), is a Mac-only shareware product. You can get a copy for $40 (or register an acquired copy for $30) from Alverson Software, 5635 Cross Creek Court, Mason, OH 45040.

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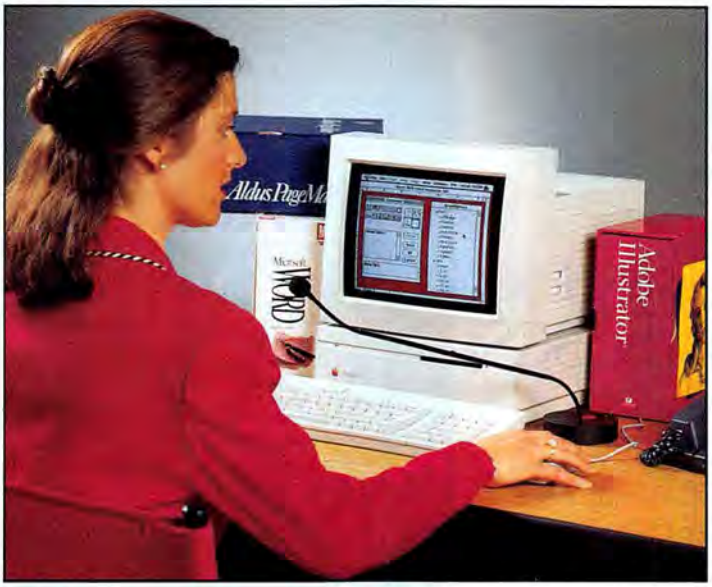
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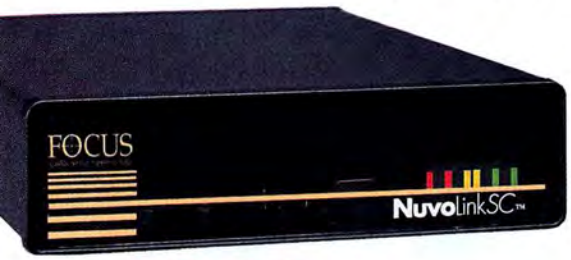
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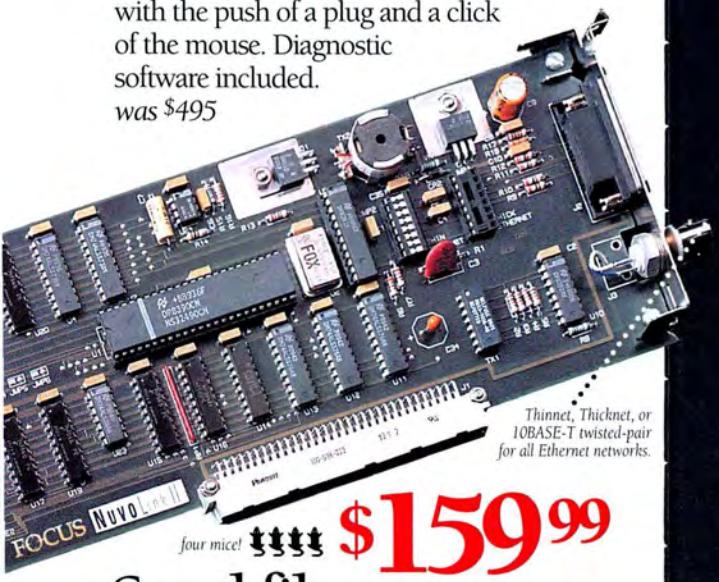
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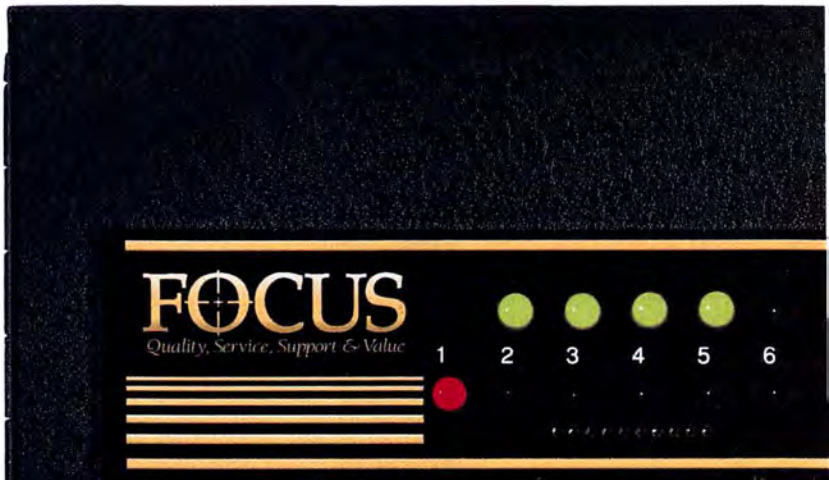


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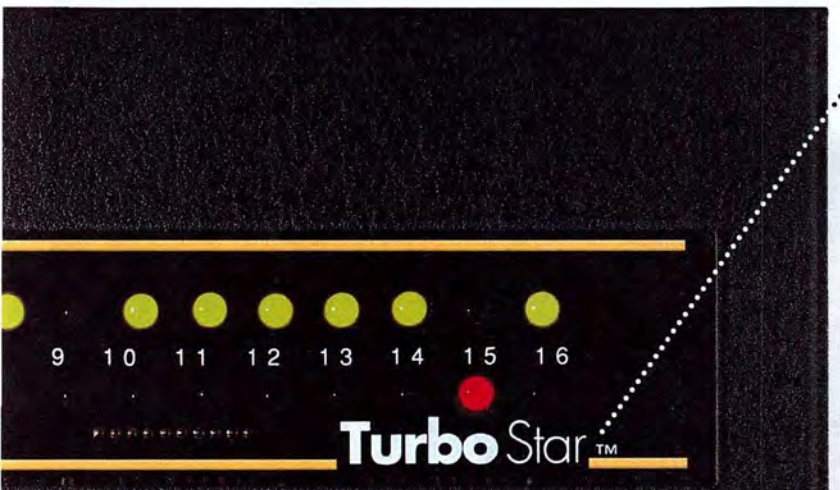
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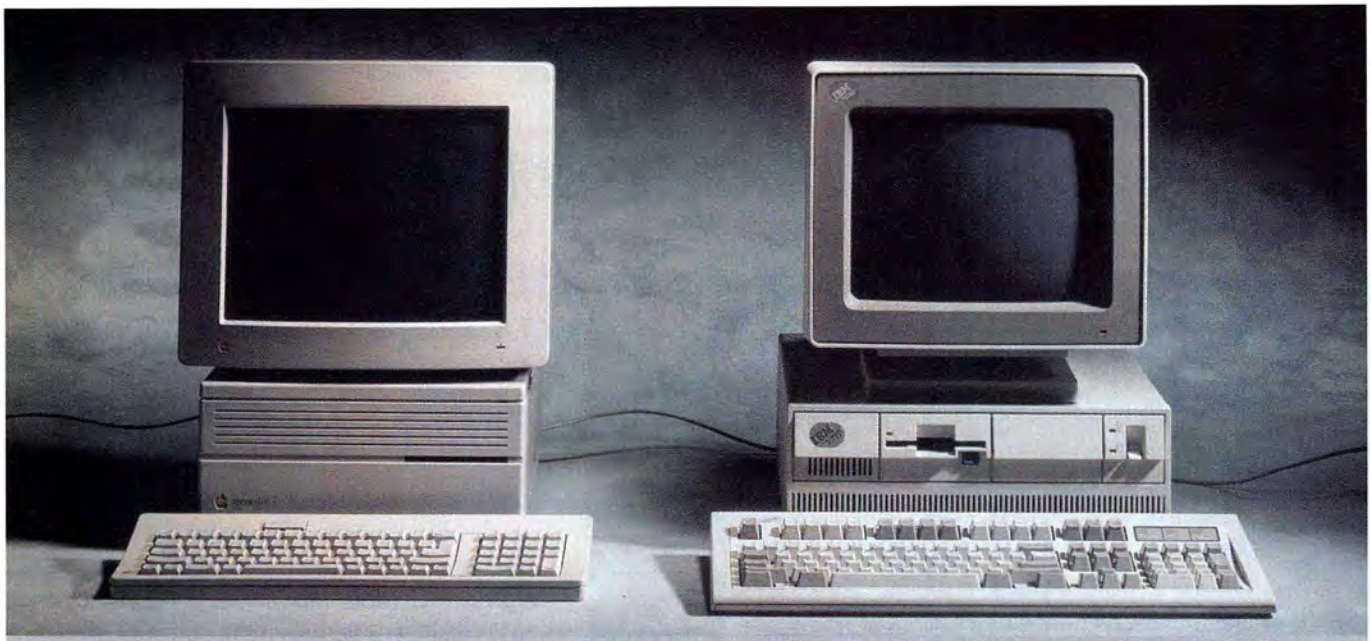
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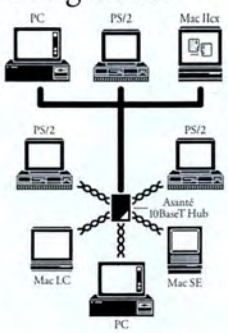
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JON ZILBER

The 29¢ Crusades



A simple letter to Apple could get you the help you need to prevent downtime disasters.

Chances are, your car contains a computer that tells your mechanic what's wrong when the car breaks down. Your office copier may contain a gizmo that automatically calls for service whenever some bozo tries to run stapled pages through the auto-feed mechanism. You can even get a clock with a built-in satellite downlink to automatically adjust the time every time the season for Daylight Saving Time rolls around.

About the only digital device that doesn't have built-in diagnostics is the one that needs it most: your computer.

If you've spent at least a few frustrating hours trying to figure out why your Mac won't do something simple it did yesterday — such as open an application or print a document — you should know there's a tool that can solve most of your problems. But it's going to take a unified effort to get Apple to adopt this solution. Your end of the bargain will take just five minutes — five minutes that may save you hours or days down the road.

First, a little background.

The Myth of Productivity

Recent studies have uncovered an astonishing fact: Personal computers, despite all their supposed time-saving benefits, haven't boosted white-collar productivity in the U.S. by a single percentage point. Although desktop computers may have improved the *quality* of working life, they continue to fail at what most of us really want them to do: reduce the number of hours in our working day.

Every minute saved by smoothly reflowing a page layout or recalculating a complex spreadsheet gets eaten up by another minute's worth of troubleshooting an extension conflict or by an hour-long ordeal coaxing a printer to deliver the goods.

For all its impressive capabilities, the Mac's operating environment — System 7, the Finder, AppleTalk, and the rest of the infrastructure — is on shakier ground than the San Andreas fault.

When your system goes down, it's next to impossible to track down the cause of the crash. Generally, the only assistance you get, if any, is a cryptic error message or a mockingly sympathetic sad Mac.

Bounce the Checker

At the pinnacle of Apple's inadequacy stands the Compatibility Checker. Apple led users to think the Compatibility Checker was actually diagnosing your system to identify existing or potential problems you might face when you upgraded to System 7. In reality, the Compatibility Checker simply checked the names of your applications, utilities, and hardware drivers against a flimsy and inaccurate database of information supplied by software vendors.

Some vendors prematurely claimed compatibility, figuring that their software would probably be compatible by the time System 7 actually shipped. Others took a conservative stance, declining to claim the full-compatibility status they deserved, simply because they had not yet finished rigorously testing their software.

The net result is that some users continue to hold off on System 7 out of unwarranted paranoia while others, buoyed by an imaginary safety net, have rushed headlong into a nightmarish upgrade experience that tainted Apple's credibility.

But behind every failure on Apple's part lies an opportunity for third-party companies to shine. Although Apple's Compatibility Checker was but a hollow shell of false hope, Help! (from Teknosys, of Tampa, Florida) is a solid solution.

Help Yourself

Help! is a thorough and stylish application that analyzes the contents of your Mac — system files, installed hardware, fonts, and so forth — and compares them with a database of known incompatibilities, conflicts, and other trouble spots. The database contains information on more than 2,100 products and presents you with a comprehensive and quite readable report that lets you know exactly what you have on your Mac and specifies the nature of any potential pitfalls.

Although Teknosys has done an impressive job, it relies on the voluntary support of users and other third-party vendors to keep its database comprehensive and current. Apple clearly needs Help! — but Teknosys also needs Apple's help. Apple ought to use its position of leadership to make Help! an industry standard.

In addition to alleviating many problems right off the bat, Help! could simplify more-complex diagnoses by defining an industry-standard format for profiling your system. Whenever you called for tech support from Apple or third-party vendors, you could fax or modem your system's profile to them,

enabling them to provide faster and more accurate diagnosis. Your downtime would be minimized, and vendors' costs for technical support would plummet, resulting in a significant reduction in hardware and software costs.

If you're frustrated by the lackluster nature of Apple's efforts at solving your downtime dilemmas, let Apple know that you demand action. Send us your letters demanding that Apple incorporate a diagnostic tool such as Help! into the Mac's system software, and we'll relay them to Apple.

While you're in a crusading mood, we'll make it easy for you to join two more campaigns, all for a few minutes of your time and the price of postage. Send your missives to The 29¢ Crusades, c/o *MacUser*, 950 Tower Lane, 18th Floor, Foster City, CA 94404. We'll forward your letters to each organization.

Taxing Matters

Round about April 15, there's only one thing worse than being a taxpayer: being a tax collector. However, the Internal Revenue Service is gradually moving into the 1980s in its use of computer technology to streamline its operations (squarely putting it a decade ahead of the rest of the federal government).

This past year, the IRS implemented a trial program that allowed taxpayers to submit their returns electronically, for faster and more accurate processing. Unfortunately, the test program paid for by your tax dollars was limited to PC users. If you object to taxation without Mac representation, let the IRS know that you demand Mac-friendly tax reform.

Audit Thyself

Software piracy is wrong, unethical, and ultimately self-destructive. The final cost of software piracy is as hard to pin down as the cost to humanity of the destruction of tropical rain forests. Each rain forest that vanishes takes with it dozens of species of plants that are unique to that rain forest. When a species becomes extinct, the planet loses an invaluable resource — whether it's the raw material for a miracle medical cure we'll never harvest or simply a flower of exquisite beauty. And every time a software company goes down, we can only guess what unique contribution will now never be realized.

If these arguments aren't enough to get you to go legit, there's one more that might: You just might get caught. The Software Publishers Association is successfully prosecuting an increasing number of piracy cases. For those who want to go straight, the SPA offers a self-audit kit to help them compute with a clean conscience. And if you're frustrated by software licenses that imply you're not allowed to use the package you paid for on both your desktop machine and your PowerBook, the SPA is the group that needs to hear your gripe.

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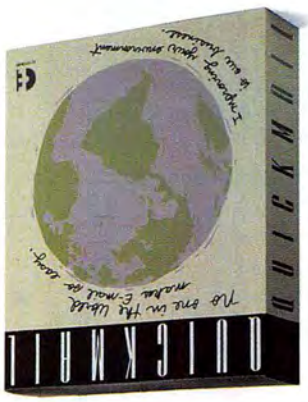
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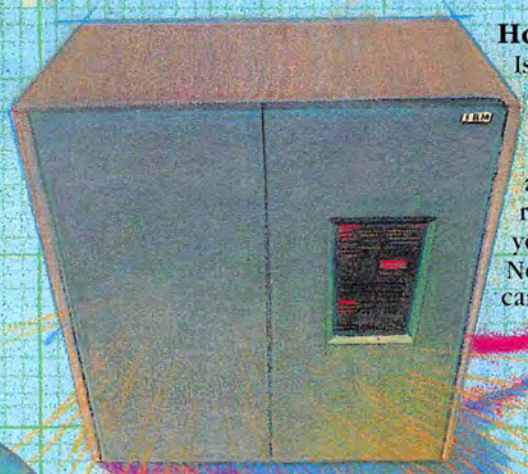
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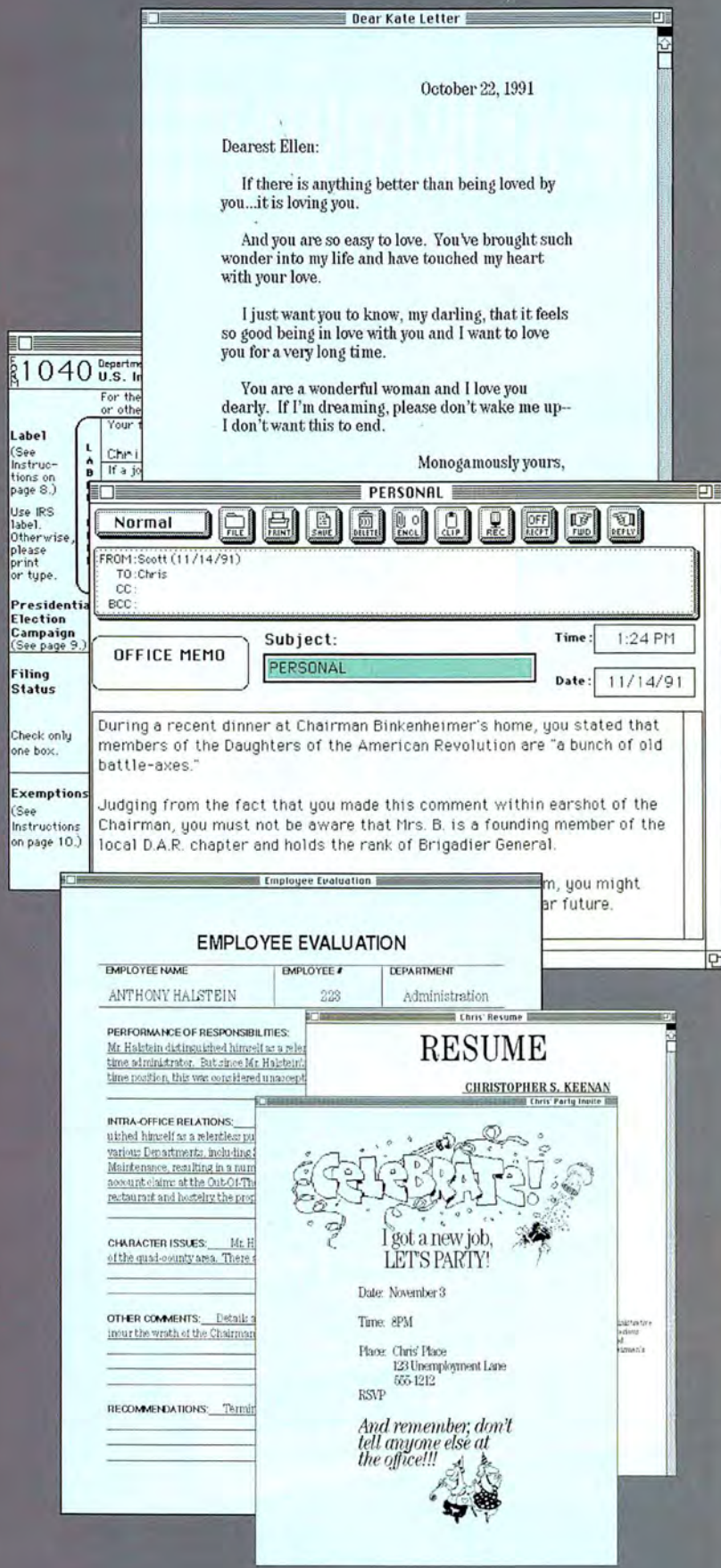
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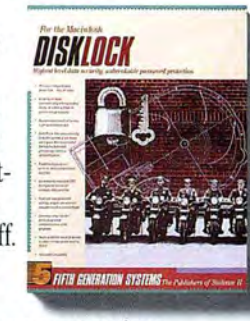
How about the Confidential Employee Evaluation you were working on when the Boss hauled you into his office for a chat?

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GUY KAWASAKI

Just Undo It



Guy's last waltz — an end, a beginning, and a few lessons on life, work, and Macintosh.

This is the last column I'll be writing for *MacUser*. I'm giving it up, because the editors of the magazine felt that my investment and involvement with After Hours Software and Salient were inappropriate. Specifically, *MacUser* requested that I cease and desist using my picture in ads for After Hours Software.

I tried to go along with this separation of Guy the columnist and Guy the huckster, but after a couple of months, I concluded that it was a farce. I informed the editors that I was going to allow After Hours Software to use my picture, and the editors and I decided that it would be best for me to ride off into the sunset.

I see the editors' point and their perspective, and life goes on. Maybe it's the best thing for both of us — for me, anyway, because it is going to force me to go beyond Macintosh and the computer industry in my writing.

Beyond Macintosh

When you make a big decision like this, your mind goes through many gyrations: Should I give up my column to sell a few more copies of TouchBASE and DateBook? Will people forget who I am? Will this be a mistake I'll regret?

This got me to thinking about other decisions I've made and the hindsights I've accumulated in 38 years of existence on this planet. If I could do my life over again — if I could just undo it — what would I do differently? What truths have I discovered? What insights can I pass on to others?

This got me to thinking about decisions other people have made in their lives. What would they have done differently? What truths have they discovered? What insights would they like to pass on to others? What can we garner from the knowledge of our senior citizens (that is, anyone older than 38)?

This got me to thinking that the hindsights of people would be a great topic for a book. All kinds of people: rich, poor, powerful, powerless, famous, unknown. Teachers. Waiters. Clerks. Mechanics. Criminals. Billionaires. Ministers. What oral history and lessons could they leave so that people wouldn't make the same mistakes and could optimize their own lives?

So I decided to start another book. Its working title is *Hindsights* (however, the marketing mavens at my publisher may change that). I'm going to interview people around the United States to document their hindsights about life: education, family, money, love, and work — whatever they want to talk about and pass on.

All modesty aside, I've written two books about how to change the world. Now I'd like to write one about how to understand it.

My role model is the writer Studs Terkel. He concentrates on interviewing blue-collar workers and describing how they feel about their lives. I want to interview a broader cross section of people and find out how they feel about their past. To give you an idea of what I'd like to do, here are some of my hindsights about high school and college.

High School

I was a diligent Oriental in high school. I studied hard. I never cheated. I took college-level classes and earned college credits, so that I could graduate early and work the rest of my life. I studied Latin, because it helped me more easily expand my vocabulary, in that many English words are derived from Latin.

I played football. I loved football. (All you Gloria Steinem wannabes should skip this paragraph.) Football is macho. I was a middle linebacker, arguably one of the most macho positions in a macho game. Very few feelings are equal to a good "stick" when you blitz the quarterback or when a wide receiver comes across the middle. (Getting System 7 to work on the first try is one of them.)

French, Music, and Tennis

Hindsight #1. Machismo aside, if I could do high school all over again, I would **learn a foreign language,** because today it's very difficult to have a conversation in Latin other than at the Vatican. And despite all my efforts to evangelize evangelism, the Pope has yet to call for my advice. You never know: If I had learned French, maybe I would still be at ACIUS. If I had learned French, maybe I would never have started ACIUS.

Hindsight #2. I would **learn to play a musical instrument.** My only connection to music today is that I was named after Guy Lombardo. (Trust me: It's better than being named after Guy's brother, Carmen.) If I'd learned to play a musical instrument when I was in high school, I could be playing it now and enjoying it for a long time. Instead, I have to buy CDs and be at the whim of the Tower Records buyers.

Hindsight #3. I would **play a noncontact sport** such as tennis. That is, I would play a sport that you can play as you cross over into

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the golden years beyond 38. Today it's difficult to get 22 guys together in a stadium to play football — probably as difficult as having a conversation in Latin. On the other hand, all the guys who wore cute white outfits and played tennis in high school can still play tennis. Meanwhile all the macho football players are sitting around watching television, drinking beer, and worrying about arthritis in their knees.

College

I was a diligent Oriental in college too. I rushed through in three and a half years. I never attended any of the overseas campus programs, because I didn't see how doing so would help me make money and it would delay my graduation. I hardly ever traveled except to return home for vacations and to meet my mother and father in Las Vegas for hands-on training in statistics and probability. I never even went to a Grateful Dead concert.

Hindsight #4. If I could do college over again, I would **stretch my college education, travel as much as *my parents* could afford, and live off them as long as possible.** I would take whole semesters off to travel after attending the overseas campuses in Italy, France, Germany, Japan, and any other country. This program would probably extend college to at least six years.

This means I would delay for as long as possible the inevitable entry into the workplace and the lifetime of servitude to bozos who knew less and worked less but made more money than I did but were still unhappy. Most people have to work for the rest of their life — what's the rush? I still wouldn't, however, go to a Grateful Dead concert.

Macintosh Hindsights

This is a Macintosh magazine, so I have to include some Macintosh hindsights. Here are two:

Hindsight #5. **You can't give software developers too much RAM.** We should have shipped the first Macintosh with 256K of RAM. It would have made software development easier and accelerated the availability of software by 9 to 12 months. We mistakenly thought that everyone could program like Andy Hertzfeld.

Hindsight #6. **Creating a "closed" system was one of the smartest things we did.** By closed, I mean that the first Mac didn't have slots and didn't have Apple II or IBM PC compatibility. This meant a shortage of software for a while, but it forced developers to create pure from-the-ground-up Macintosh software. Thank God for Steve Jobs' insistence on purity.

Hindsight #7. **A columnist has an obligation to his readership.** In the past several months, my mood has become arrogant and detached. (Some people may dispute *has become.*) Thankfully, a reader made me aware of this by telling me that he was disappointed that my column about technical support communicated the feeling of "don't bother me with your technical-support problems."

Then I was crushed when my mother told me that my column about programming was "wrong and we don't like it," because I told people to send their software directly to my church instead of to me. My father was also on the phone, and he said that I had a noblesse oblige to the readers to show more class than that. (Where he learned French, I don't know; I never did.)

They were right, of course. I should not have written those columns that way. On the other hand, I have no regrets about my columns about Singapore; Microsoft; the National Rifle Association; John Sculley; and, especially, being a wife.

A Little Help from My Friends

I hope this column made you reflect on your life and come up with hindsights and insights. Perhaps you would like to share some of your hindsights. Also, I need referrals to people to interview. If you know extraordinary people whose hindsights would be valuable, please tell me about them.

Extraordinary does not mean rich, famous, or powerful. It means people who have contributed to society and who can contribute more by telling their story. They don't need to have any connection to Macintosh and computers. In fact, I prefer that they didn't. Here's how to get in touch with me: P.O. Box 471090, San Francisco, CA 94147; 415-921-2478; 415-921-2479 (fax); 76703,3031 (CompuServe), Kawasaki2 (AppleLink), or MacWay (America Online).

You take care of yourself. And as Arnold said at the police station, "I'll be back." While I'm gone, just remember a few things:

- Do the right thing, the right way.
- No job is worth a marriage.
- Enjoy your family and friends before they are gone.
- Buy any software I endorse.

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You'd be surprised at the number of people who have confided in me the fact they've given up trying to learn some of the programs. They've put the box on the shelf and simply written the expenditure off as a bad investment.

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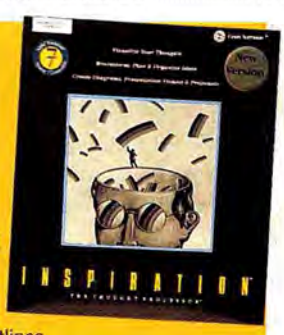
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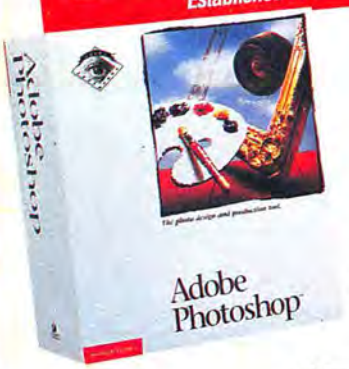
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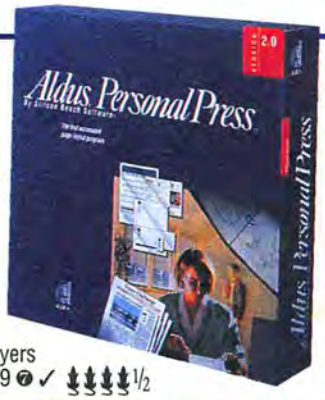
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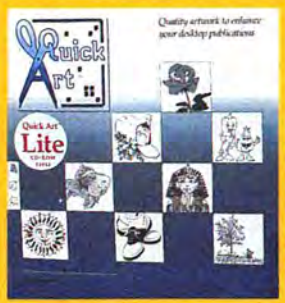
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00665	Fractal Design Painter V 2.0	248		✓
03216	Colorstudio	598		✓
Frame Technology				
03582	FrameMaker 3.0	594		✓
Light Source				
00657	Ofoto	279	❼	✓
Quark				
04736	Quark Express 3.1	579		
Softsync, Inc.				
00954	Expert Color Paint	28	❼	✓
Supermac Technology				
01576	Pixelpaint 2.1	148	❼	✓
02665	Pixelpaint Pro 2.0	489	❼	✓
TimeWorks				
04769	Publish It Easy 2.1	138	❼	✓

DISCOVER THE EXCITING WORLD OF CD-ROM



Sherlock Holmes, Consulting Detective CD-ROM $38

ICOM's Sherlock Holmes, Consulting Detective CD-ROM game features over 90 minutes of full-motion color video. Live actors, original sets, and costumes provide an interactive-movie gaming experience. ICOM Simulations #01034 ❼ ✓



Quick Art Lite CD-ROM $124

The Quick Art Lite CD-ROM contains over 1,500 high resolution 300 dpi images in TIFF format. Categories include animals, borders, energy, flowers, food, holidays, mail, maps money, occupations, office, people, science sports, travel and lots more. Can be upgraded to Quick Art Deluxe. Wayzata #00850 ❼ ✓

CD-ROMS & DRIVES

Bureau of Electronics				
04467	Monarch Notes	64	❼	✓
04468	Greatest Literature	64	❼	✓
04469	Us History On CD ROM	249	❼	✓
04470	Countries Of The World	249	❼	✓
CD Technology				
04958	Multimedia Hand Disc	74	❼	✓
Cyan				
03493	Cosmic Osmo CD ROM	45	❼	✓
Microsoft Corporation				
03233	Microsoft Office CD ROM	598	❼	✓
ShirtPocket Software				
05158	SpeedyCD	46		
Sunshine				
04331	Visual Delights CD ROM	209		✓
Tactic Software				
04219	Tactic Multimedia CD-ROM	149	❼	✓
Wayzata Technology Inc.				
00853	Quick Art Deluxe	179	❼	✓
03507	Disc to the Future CD ROM	78	❼	✓
01018	Space, Time, and Art CD ROM	129	❼	✓
03863	CD Funhouse	39	❼	✓
00244	Down to Earth	155	❼	✓
03512	Gem (Public Domain) CD ROM	75	❼	✓

WISE UP!

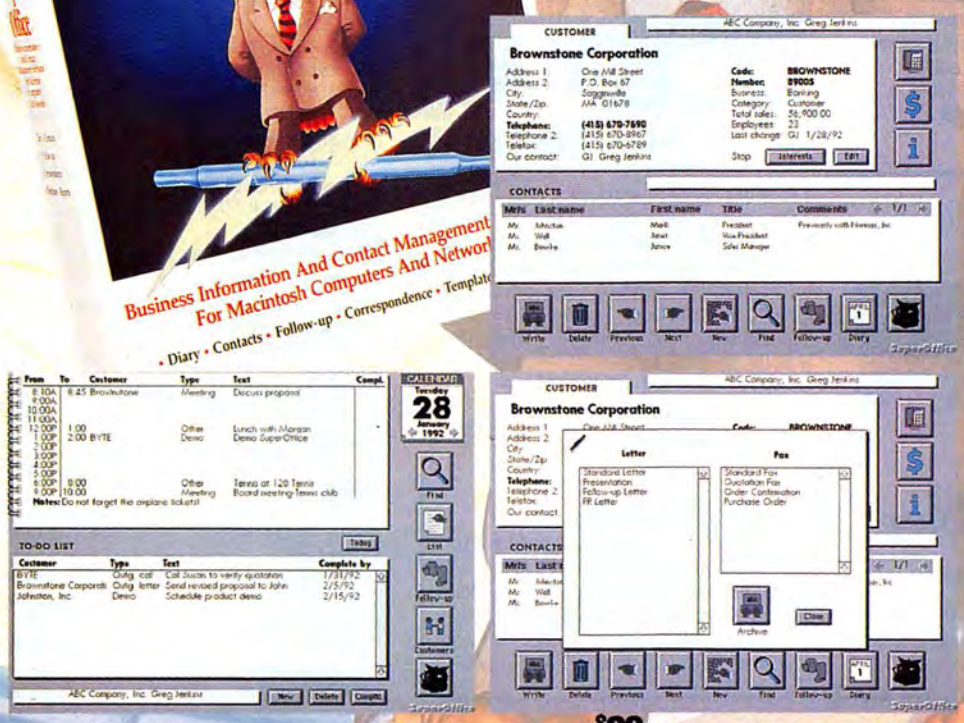
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SuperOffice $248

Stop rummaging around your desktop for the information you need to get the job done. SuperOffice puts everything you need right at your fingertips.

If you're a busy business person with dozens of appointments, customers and commitments, SuperOffice can help you get on top of the information maze and stay there.





SuperOffice is a fully integrated, multi- or single-user database system for use on PC/Windows and Apple Macintosh.

The SuperOffice package provides you with an excellent set of organizational tools. You get a diary for tracking your daily activities, an advanced time manager, a to-do list, a planned activities follow-up utility, a customers file to keep track of key contacts, letter/fax/spreadsheet templates, four types of reports (customers by user-definable categories, customer list, mailing label and customer follow-up), and much more. #04966

SuperOffice Competitive Upgrade #01001.....**$69**
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Here are some of the reasons why SuperOffice is one of the most effective business productivity packages available:

It's easy to use. SuperOffice uses only a few screens, and it prompts you for all entries. You can choose to run the program with the intuitive ease of pull-down menus or the speed and simplicity of command "speed" keys. SuperOffice windows resemble familiar desk items, e.g., Post-It notes, calendar pages, index cards and paper clips.

It's multi-user compatible. With the multi-user version you can share access to the same information. On a common network, Macintosh and MS-DOS computers can access the same file.

It's powerful. Powerful and comprehensive, SuperOffice business information and contact management software instantly provides you with the information you need to succeed.

It's flexible. You get user-definable system setup, user-definable spreadsheet and word processing templates, user definable contact classification fields and more. Going on a business trip? Export the data you need from SuperOffice and update the master data file with the new information when you get back.

It's compatible with what you're using now. You can access most popular business software from within SuperOffice. Microsoft Word, Microsoft Excel, PowerPoint, MacWrite, Aldus PageMaker, WordPerfect, Lotus 1-2-3, Ami Pro and others are but a few of the supported applications.

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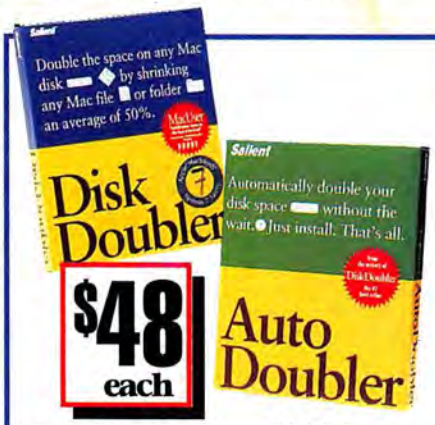




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Speed up your hard disk and get more work done faster with DiskExpress II, one of the safest and most powerful disk optimizers available. DiskExpress II monitors your file usage to determine the optimal location for files on your hard disk. It works transparently, keeping your hard disk running at maximum speed and efficiency. Alsoft #00618 ❼ ✓



DiskDoubler

Make your disk drive more efficient. DiskDoubler effectively doubles or triples your storage capacity. Salient Software #03515 ❼ ✓



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What if you could turn your ImageWriter II into a full-color printer—producing over 250,000 colors from a four-color ribbon. You can with MacPalette II. On-line help dialog boxes help make this chooser-level printer easy to operate. Also compatible with Mac Classic II, Quadra Series and Powerbook 140 and 170. Compatible with any of the Macintosh II series, the Mac LC, the SE/30 and most Macintosh software. Microspot #0818 ✓

MacPalette II (Apple Talk) #04326 ❼ ✓ $162

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AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. Salient Software #04955 ❼ ✓

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02853 DiskExpress II 2.0 ..... 49 ❼ ✓

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02785 After Dark 2.0U ..... 28 ❼ ✓

Casa Blanca Works, Inc
04962 Drive Share ..... 89 ❼ ✓
00858 Drive 7 Universal Formatter 2.0 ..... 49 ❼ ✓

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04722 Disk Fit Pro ..... 69 ❼ ✓
03828 Remote 10Pk 1.3 w/oRetrospect . 146 ❼ ✓
02586 Retrospect 1.3 ..... 146 ❼ ✓

Fifth Generation
04989 Superlaserspool 3.0 ..... 98 ❼ ✓
04815 Fastback Plus 2.6 ..... 117 ❼ ✓
02194 Pyro! 4.0 for Mac ..... 24 ❼ ✓
01122 Superspool 5.0 ..... 61 ❼ ✓

FWB, Inc
00555 Hard Disk Toolkit ..... 124 ❼ ✓

GDT Software Inc.
00642 PowerPrint ..... 94 ❼ ✓
00901 Betterwriter V1.0.1 ..... 38 ❼ ✓

Handoff Corporation
00855 Trashmaster 1.0 ..... 39 ❼ ✓

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04542 On Cue II 2.0 ..... 56 ✓

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00258 Folderbolt 1.0 ..... 73 ❼ ✓

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04811 Empower II V4.07 ..... 148 ❼ ✓

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05025 Snooper ..... 128 ❼ ✓

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05046 Microcom Value Pak (MVP) ..... 158 ❼ ✓
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04191 Now Utilities 3.0 ..... 83 ❼ ✓

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04955 Auto Doubler ..... 48 ❼ ✓
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04890 Norton Utilities 2.0 ..... 98 ❼ ✓
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04762 Wallpaper ..... 37 ❼ ✓

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04897 Supersolvers Outnumbered Mac ... 33 ❼ ✓
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00072 Number Munchers, Super Munchers, or Word Munchers ..... 28 ❼ ✓

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03102 Word Quest ..... 30 ❼ ✓
01931 Turbo Math Facts ..... 24 ❼

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04559 Creepy Castle ..... 32 ✓

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04675 Sierra Kings Quest V ..... 34 ✓
Heart of China or Rise of Dragon ... 34 ✓
04681 Leisure Suit Larry 5 ..... 34 ✓

Velocity
04816 Spectre ..... 38 ✓
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04992 105MB Ext. HD ZFP Box 498
05244 120MB Ext. HD ZFP Box 558
05245 240MB Ext. HD ZFP Box 874
05246 425MB Ext. HD ZFP Box 1438

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04886 88Mb Removable Syquest 698
04880 52MB Q Ext. Quantum 358
04881 105MB EXT Quantum 498
04882 240MB Q Ext. Quantum 848

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00505 PocketHammer 50 598
00506 PocketHammer 100 768
04891 PocketHammer 200 1198
04964 HammerDisk 88MB Removable .. 948
04965 HammerDisk 44MB Removable .. 755
00845 PocketHammer 425 1988
00822 Hammer 300 1698
00823 Hammer 300 FMF 2074
00840 Hammer 600 ..... Call
00841 Hammer 600 FMF ..... Call
00842 Hammer 1000 ..... Call
00843 Hammer 1400 ..... Call
00844 Hammer 1400 FMF ..... Call
00846 HammerDisk 600S ..... Call

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05007 60 MB S EXT HD 378
05008 105MB Q EXT HD 558
05009 210MB Q EXT HD 898

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00332 DataPak MO/128 3.5" OPtical 1629
00335 Diam.Drive 80Portable 2" Drive ... 439
00336 Diam.Drive 120Portable 2" Dr. 549
00337 Diam.Drive 210Portable 2" Dr. 949
00338 Diam.Drive 320Portable 2" Dr. 1499
00339 Diam.Drive 510Port. 2" Drive 1949
00899 HitchHiker 40MB 499
00971 HitchHiker 80MB 679
04062 DataPak 88 Rem. 799
04612 Diamond Drive 120 599
04613 Diamond Drive 210 998
04614 Diamond Drive 320 1629
04615 Diamond Drive 510 2149



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The new 1.44Mb floppy "plus drive" is one of the finest drives available for the Mac. Its features include: SuperDrive capability with the Mac Plus, SE and Mac II family; MS-DOS compatibility; two color read/write activity light; auto, touch & paper clip eject; die cast Apple "platinum" case; and manufacturer's full one-year warranty. Applied Engineering #04956 ✓

DataPak 45 Removable



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The DataPak 45 Removable provides low-cost expandability and high-quality performance—they're actually faster than many fixed hard drives! Comes with dual SCSI ports, SCSI cable, external terminator and more. MASS Micro Systems #00175

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FWB PocketHammer 50

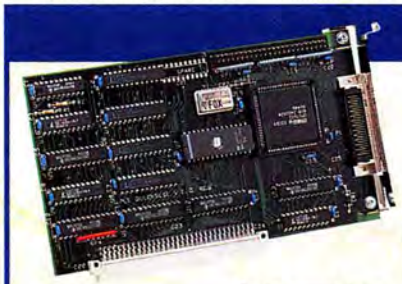
The PocketHammer 50 costs a little more than the average 50Mb hard drive because it's in a class by itself for performance, security and reliability. The PocketHammer 50 includes external SCSI termination, push-button SCSI-ID selection, external fuse and Hard Disk ToolKit software. FWB #00505



Hard Disk Toolkit $124

Hard Disk ToolKit™ replaces your SCSI hard disk or removable drive's original installer with a sophisticated multi-module SCSI utility package that gives you total control over your SCSI environment. It's easy to use, yet offers the performance, power and flexibility demanded by sophisticated users. Works with virtually any hard drive. FWB #00555

QUALITY DRIVES FROM PLI



QuickSCSI Card $372

The PLI QuickSCSI Card offers a simple, powerful way to eliminate Macintosh SCSI port bottlenecks. It lets your hard drive work at its maximum possible performance level by supporting high speed data transfer rates. The disk mirroring option lets you copy exact contents of an entire drive to another. Run up to 14 SCSI devices simultaneously. PLI #00811



PLI Infinity Optical 3.5" $1639

Now you can store up to 128Mb of data on a single cartridge that is almost indestructible, and weighs less than five diskettes. Backed by the manufacturer's 1-year warranty. PLI #04698

PLI External CD-ROM Drive $679

The PLI CD-ROM is one of the most fully-featured internal ROM drives available. It has a self-cleaning objective lens, eliminating bothersome dust problems. It offers audio output through a 1/8" headphone jack and two RCA jacks. PLI #03691

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00873	TransWarp 040	2189	❼ ✓
03673	Quadralink	208	❼ ✓
04072	Cache In 50 w/➢	1899	❼ ✓
04120	Fast Math LC	139	❼ ✓
04325	TransWarp SE 25MHz w/➢	798	❼ ✓
04732	TransWarp LC 33MHz w/➢	998	❼ ✓
04735	TransWarp SE 40 MHz w/➢	1499	❼ ✓
04903	TransWarp LC 33MHz	799	❼ ✓
04904	Fastmath Classic II	139	❼ ✓
04732	TransWarp LC 33MHz	998	❼ ✓
04904	Fastmath Classic II	139	❼ ✓

DayStar Digital

00560	Equalizer LC Virtual Mem Upgr ➢	259	❼ ✓
05003	Power Math LC	118	❼ ✓
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03729	SCSI Powercard w/o Simms	1124	❼ ✓
03730	Ram Powercard w/o Simms	499	❼ ✓
04181	Fast Cache IIsi	309	❼ ✓
04182	Dual Port IIsi w/➢	169	❼ ✓
05005	Combo Cache IIsi ➢	258	❼ ✓
00562	Fast Cache PDS /si Fpu+ Adpt ➢	394	❼ ✓
05006	Fast Cache IIci (32k)	184	❼ ✓
02877	Fast Cache IIci 64K Ram	278	❼ ✓
04323	UniV.Powercache 33 MHz ➢	643	❼ ✓
04319	Universal Powercache 40MHz ➢	868	❼ ✓
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04919	16MHz (SE) ➢	399	❼ ✓
04920	25MHz w/➢ (SE)	819	❼ ✓
04922	33MHz w/➢ (SE)	1789	❼ ✓
04923	25MHz w/➢ (Plus&512E)	839	❼ ✓
04925	16MHz ➢ & VID Plus & 512E	719	❼ ✓
04926	SE Video F/Radius FPD	289	❼ ✓
04952	16MHz Classic ➢	489	❼ ✓

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00821	Rocket 25i	1348	❼
01004	Rocket 25i/24X Card Bundle	2498	❼
04207	Rocket	1798	❼
05250	Rocket 33	2178	❼

Sigma Designs

00215	Double-Up Board	149	❼
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Technology Works

04905	1 MB Memory Upgrade TI Ps-17	69	❼
04906	PowerBook 100 4MB SRAM	469	❼



White Knight II $84

White Knight 11 (previously known as Red Ryder) has been called the best all-around telecommunications program available. It gives you technical sophistication, flexibility and user-friendliness...at a great price. Features include: a full-featured BBS package, a text log, security and access restriction, file transfers, message sections, a powerful scripting language, gateway functions, technical support and more. Freesoft #02881 ❼ ✓

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Applied Engineering

04579	Datalink LC V.42 Fax/Modem	259	✓

Best Data

00698	Smart One 2400 Mac FaxMod.	110	

Hayes

00451	Personal Modem 2400+	148	❼
04796	Ultra9600 w/Smartcom IIMac	698	❼
04497	Smartcom II 3.3	83	❼
07829	Optima 24/SC EZ	158	❼
09936	Optima 96.32 w/Sc Ez	515	❼

Logicode Technology

00852	Xeba 2400 Ext	99	❼
04644	Xeba 96/24 S/R Fax/V.42Bis Black	199	❼

Mass Microsystems

00701	24/96 Fax Modem	179	

MacTurbo

00408	Plus Modem	89	✓
00977	24/96 Fax Modem	149	✓

Prometheus

00331	PowerBk Home Office Int 24/96	269	✓
00877	Home Office Ultima Ext	498	
00907	Home Office 24/96 w/ Voice	269	
04596	Promodem 2496 S/R Mini Fax+	268	❼ ✓

PSI Integration, Inc.

04948	PSI Powermodem 24/96SR Int.	215	❼ ✓

Shiva

01615	Netmodem V2400	338	❼
03251	Netmodem V.32 9600	1149	❼
04129	Netmodem/E 10 BaSE T	1749	❼
04491	Netmodem E Thin/Bnc	1749	❼
04758	Netmodem/E Thick	1749	❼
04759	Netmodem/E AUI	1749	❼
05128	LanRover/L	628	❼

Supra Corporation

00065	Modem 2400 Plus	148	❼
00413	Fax Modem V.32BIS wsft/cbl	379	❼
00414	Fax Modem V.32BIS w/o sft/cbl	319	❼
00424	Fax Modem V.32 w/o sft/cbl	259	❼
00426	Fax Modem V.32 wsft/cbl	329	❼
02003	Modem 2400 Baud	89	❼
03368	Modem 2400 Macpac	138	❼
04351	Fax Modem Plus	199	❼



Quicktel Xeba 2400bps Data Modem $99

With the Quicktel Xeba 2400bps Modem you get unique styling and rock-solid engineering at a great price. It comes with everything you need to get up and running. The package includes data communications software and cable. Works with Mac plus and up machines. Logicode #00852

$199 Xeba 24/96 S/R Fax Modem w/V.42bis

You will not find a 24/96 bps send/receive Fax Modem at a better price. The Zeba offers multiple transfer speeds and is available in black or gray. Includes Mac cable. Comes with QuickLink II data communications software and STF fax software. Logicode Technology, Inc. #04644 black, platinum #04674.

Code #20701

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#05026 ❼ ✓.... **$168**

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SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with the hardware diagnostic.

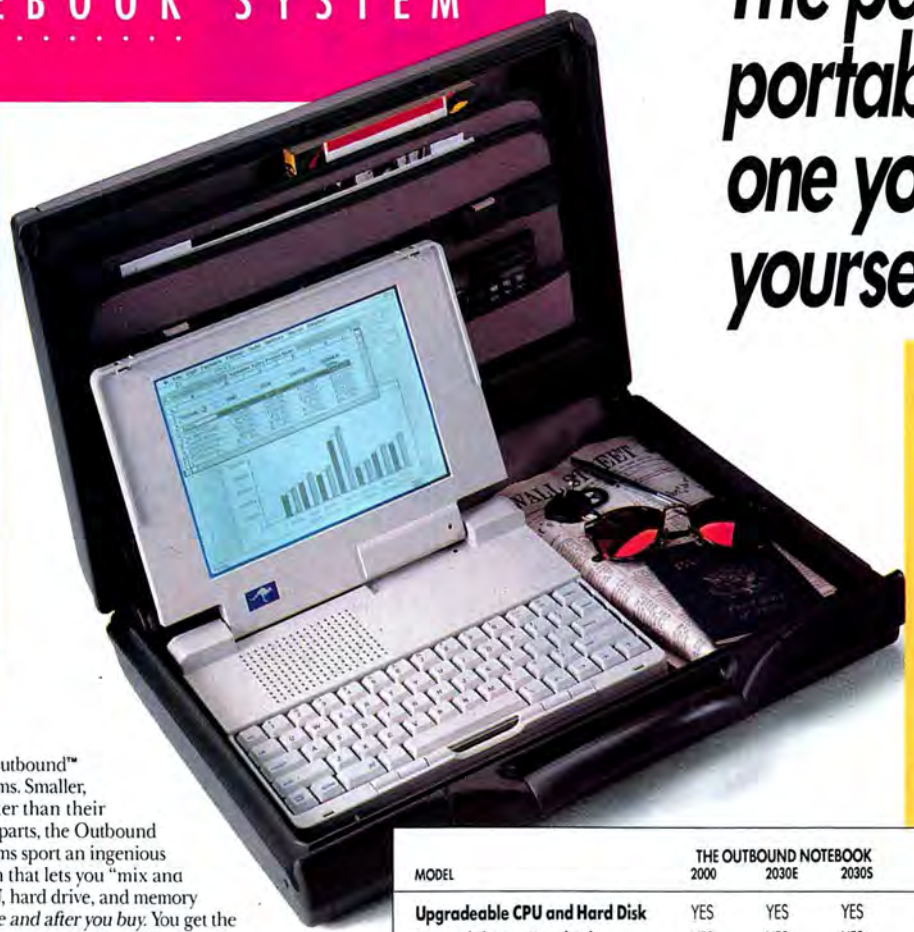
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Perform big business in small places

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What the experts say:

"Outbound offers top-notch portable Mac."
MacWEEK Magazine

"Outbound's notebooks are solid machines and deserve serious consideration by anyone contemplating buying a Mac notebook."
Macworld Magazine

"Outbound's new Notebook System has the unique ability to grow along with your requirements – and your budget."
MacUser Magazine

"Innovative touches, a high degree of compatibility, and moderate pricing make the Outbound Notebooks strong competitors with Apple's portable Macs."
Portable Office Magazine

"For me, the Outbound Notebook is the better choice."
BYTE Magazine

MODEL	THE OUTBOUND NOTEBOOK 2000	2030E	2030S	MACINTOSH POWERBOOK 100	140	170
Upgradeable CPU and Hard Disk	YES	YES	YES	No	No	No
Internal Floppy Standard	YES	YES	YES	No	Yes	Yes
Processor Speed	20MHz	25MHz	33MHz	16MHz	16MHz	25MHz
Maximum Hard Drive Available	120MB	120MB	120MB	20MB	40MB	40MB
Full Size Silent Keyboard and True Notebook Size	YES	YES	YES	No	No	No
Maximum RAM Available	4MB	14MB	14MB	8MB	8MB	8MB
Math Coprocessor	No	Optional	Optional	No	No	Yes
Maximum Silicon Disk Memory (RAM) Available	12MB	50MB	50MB	6MB	6MB	6MB
Price	2000/220 $1999	2030E/220 $2499	2030S/440 $3899	100/220 Ext. Floppy $2199	140/220 $2899	170/440 $4599

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CIRCLE 79 ON READER SERVICE CARD.

MICHAEL SWAINE

SOS HyperCard



Attention, Claris: HyperCard's future is teetering on the brink of oblivion — but it's also just seven steps away from salvation.

I'm not saying I was wrong, but . . . .

When Apple first released HyperCard in 1987, I poked fun at those who tried to shoehorn it into existing software categories. Clearly, I pontificated, HyperCard is a new category unto itself, a "software erector set," as Bill Atkinson described it. Now, five years later, I find myself urging that it be repurposed, shoehorned into a clear-cut existing software category.

What's changed is ownership. In 1987, HyperCard didn't need to be sold: It was Apple system software, bundled with every new Mac. In 1992, HyperCard is a Claris product with profitability expectations, and the once-sacrosanct bundle agreement with Apple is in question. To survive as a commercial product, HyperCard needs a clear definition, which means that it needs to fit into an existing product category, which means that it can no longer be all things to all people. Which means that Claris has to make some choices.

I made such a choice in positioning my HyperCard-oriented publication, *HyperPub,* as a developer journal, and I haven't regretted it. So my recommendations for Claris are these:

1. Make HyperCard a serious platform for software development and nothing else. Focusing on developers means treating users as a tool for market development rather than as potential customers. That makes sense. You can't make any money selling a formerly free, ill-defined product to users. (Developers are something else.) And any characterization of HyperCard except as a development platform will necessarily be ill-defined, because HyperCard actually is (at least) a development platform.

Nor will you make any money selling users HyperCard add-ons. Although the stackware/stack-tools market has been lucrative for some small vendors and could be for many more, it's not an opportunity that a company the size of Claris can exploit. That leaves developers.

"Developers" doesn't mean just commercial developers. There are many development audiences, and you have to decide which to support most aggressively. You have strong customer bases in education, in-house corporate programming, CD-ROM and multimedia development, the design of certain kinds of help systems, and commercial stackware development. Those are good places to start.

2. Keep the Apple bundle deal. You must do this. How are you going to sell HyperCard to developers if you let their captive market get away?

Just what gets bundled is the question. You do have to differentiate what users get free from what developers won't mind paying for. But the bundled version had better not seem crippled. It also needs to be stable in the sense that the current version will read future stacks. Developers shouldn't have to ask users which version they have. And it needs to be rich enough and come with enough examples to make users feel it's worthwhile.

3. Support developers. Apple is taking an interesting direction with system software, selling modules that enhance core functionality. But that's nothing new for development platforms. You should follow that model — rather than producing new versions of HyperCard for users — and generate a stream of plug-in modules for HyperCard developers — rather than producing a lot of new versions of the basic product. Your goal should be to keep the user platform stable and the user investment low while providing developers with tools that allow them to differentiate their products and also tapping them regularly for money.

Among the modules you feed developers should be niche tools for the aforementioned established HyperCard markets. With the new Macs that are coming out with built-in CD-ROM drives, it would be a shame to lose the lead you have in multimedia to third-party companies such as Macromedia (or to PCs).

4. Port it to Windows. You've already demonstrated your commitment to doing Windows products — but will you do them right?

Port both the run-time and the developer versions, of course. To fail to do a Windows developer version would be to ignore a potentially much larger market than you now have, snub your primary customers, and saddle HyperCard's business plan with the job of pulling developers back to the Mac.

Of course, stacks should run without conversion on both platforms, and a developer ought to be able to modify a Mac-created and -resident stack across a network from a PC running Windows.

5. Port it to other platforms as soon as they arrive on the scene. The new object-oriented operating system now under development at Taligent is an obvious example. But also consider ports to UNIX-based systems such as the Sun and NeXT workstations,



CIRCLE 19 ON READER SERVICE CARD.

which are now price-competitive with high-end Macs. Don't get bogged down in thinking that HyperCard *is* its user interface or its application-programmer interface; it's a market wedge, like Windows. And you *know* that Microsoft is ready to graft the Windows name onto whatever new technology comes along.

Of course, there is an Apple II version of HyperCard. Whether or not you should pursue that version depends on how seriously you take the Apple II education market.

And by all means, port HyperCard to pen systems and Apple's soon-to-be announced personal digital assistants. Pen-based machines are going to open entirely new markets for computers. But do it by adding real pen modules for developers, not by grafting on a HyperCard interface in which pen actions get mapped to code that was designed for mouse moves.

6. Make it either competitive or symbiotic with other development environments. HyperCard needs to survive in a market that already contains stacklike products such as Aldus' SuperCard, Spinnaker's Plus, and Asymetrix' ToolBook; visual development systems such as TGS Systems' Prograph and Macromedia's Authorware; shells such as Apple's MacApp; scripting systems such as UserLand's Frontier and Apple's own AppleScript; and serious development systems such as Symantec's THINK C and THINK Pascal and Digitalk's Smalltalk.

Scripting systems need not be a threat if HyperCard meets a clear and unique need and works well with these systems. That probably means that HyperCard needs to be truly IAC-compatible; needs to have exemplary ability to send and receive Apple events; needs tools to let developers at all levels of sophistication use IAC; and needs explicit hooks to scripting systems and a clear story on HyperCard's advantages for IAC, with sample tools showing how to exploit these advantages.

HyperCard won't coexist with visual programming languages; it needs to compete directly with them. Authorware is a serious competitor in the corporate-training market and, if it weren't so expensive, could be a formidable competitor in the education market as well. HyperCard is already probably easy enough to use for these markets; perhaps competing here means upping the performance, adding more debugging and other developer-support tools, and making it easier to develop XCMDs.

HyperCard does need to coexist with MacApp and C and Pascal and other serious development platforms. The key here is to let HyperCard developers generate efficient code and connect with other languages. How do you do that? Fold in an XCMD compiler such as Heizer Software-distributed CompileIt? Create a mechanism that turns existing C and Pascal code into XCMDs? Listen to the developers; they'll tell you.

Coexisting with established development systems and competing with stacklike tools means that you'll need to change several things about HyperCard. First, you'll need to deal with its GUI eccentricities. It's not that the familiar HyperCard interface needs to be changed; it's just that you need to allow developers to circumvent it to write real applications. A small but telling example: Make it easy to change the icon of a HyperCard-developed file so it doesn't have to announce that it is a stack.

And please add the three things that remained on my wish list after you released 2.0: full color, draw graphics, and object buttons.

Support new technologies as soon as they arrive: the way you handled QuickTime, not the way you dealt with Apple events. And make the support smooth and full.

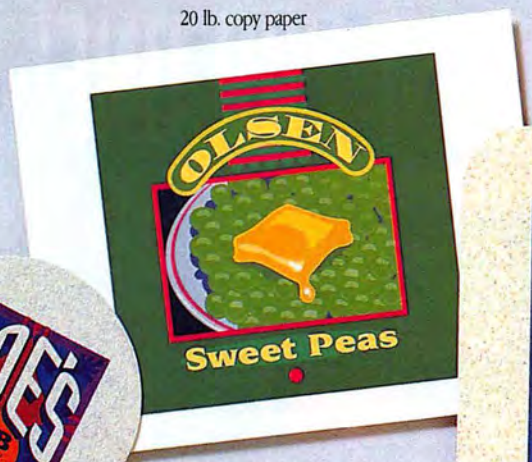
Most critically, improve performance. HyperCard can't swim in developer waters unless it can move faster than it does now.

7. Promote it adequately. If you do all these things, HyperCard will be an essentially new product with new and revitalized markets but with built-in name recognition. Be ready to invest in it and in the third-party developers who can make it succeed.

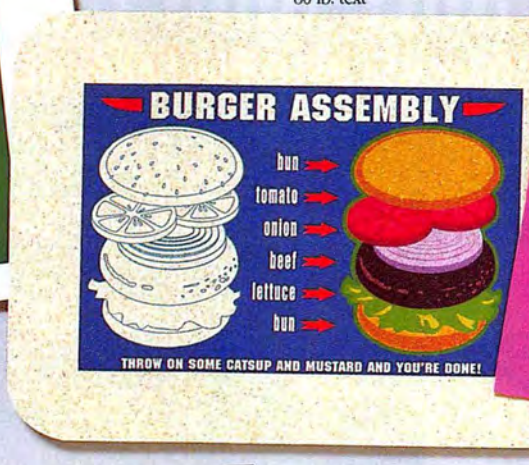
Particularly invest in the Windows market. In ToolBook, you have an established competitor, with a bundled runtime version, that will take some work to displace. And Plus is not inconsequential; Spinnaker's got the multiplatform thing working, and users know it. You'll have to sell a lot of cheap razors in this market to create the market for the blade makers to whom you plan to sell blade-making tools. That's a business plan that requires some faith. But HyperCard currently is a better product than ToolBook or Plus. The competition is vulnerable.

Anyway, that's what I'd do.

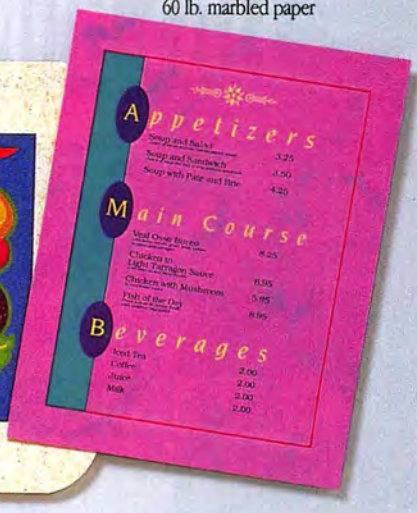
20 lb. copy paper



80 lb. text



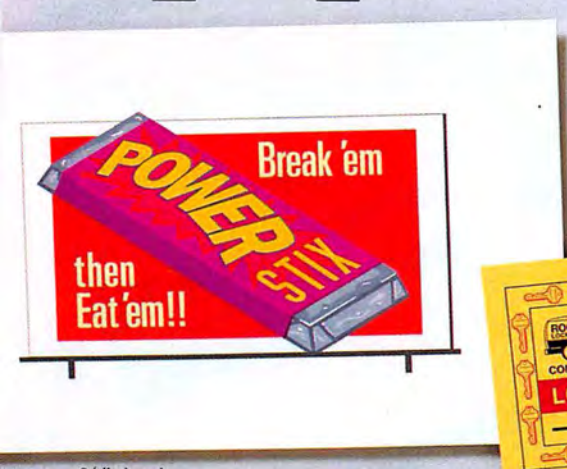
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CIRCLE 104 ON READER SERVICE CARD.



NEW ON THE MENU

You're next! IBM will soon start selling IBM clones in Europe through an IBM-owned Asian subsidiary. The clones will ship under the subsidiary's name, but at this writing, IBM still hadn't announced what that name would be. Although Big Blue hasn't announced any plans to sell its clones in the U.S., you can be sure that the execs in Armonk will be watching those European sales closely.

By Russell Ito



Apple events: Apple has recently launched several initiatives you might not have heard about. So here's a brief rundown on the latest news from Cupertino: ◎ **Version 1.1.1 of System 7 Tune-Up** is now shipping. This latest update to System 7's first update fixes the famous — and mysterious — "missing files" problem that plagued some users. Under Systems 7.0 and 7.0.1, a directory item could become corrupted so that the Finder couldn't display it or any other item that followed alphabetically. Tune-Up 1.1.1 prevents this from happening. The latest version also includes a new LaserWriter driver for the Personal LaserWriter NTR and fixes some incompatibilities with the LaserWriter Plus, IIf, and IIg. Tune-Up 1.1.1 is available from user groups, bulletin-board services, and resellers. It will also come in the System 7 Upgrade Kit and preinstalled on all new Macs. ◎ **The Apple Clean Earth Campaign** provides Apple LaserWriter users with a convenient — and free — way to recycle spent toner cartridges. Apple will now pack a prepaid return label with every cartridge, so users can recycle their cartridges free. (U.S. customers can get labels by calling 800-776-2333; customers outside the U.S. should return their spent cartridges to their Apple dealer.) Apple will also donate 50 cents to the National Wildlife Federation and the Nature Conservancy for every cartridge that's recycled. This should sound familiar, because it's the same program Hewlett-Packard launched late last year. ◎ **The Apple Exchange Program** is intended for buyers at businesses and institutions who want to trade their obsolete Macs or DOS machines for new Apple stuff. Through Electro Rent Corp. E.S.D., a third-party remarketer, Apple USA customers can now receive cash from their Apple dealers toward the purchase or lease of new Apple equipment. The trade-ins must be made in 10- to 100-unit lots and can include selected Apple, Compaq, and IBM computers plus HP laser printers. ◎ **There's more** to the Apple gestalt than just brown boxes.

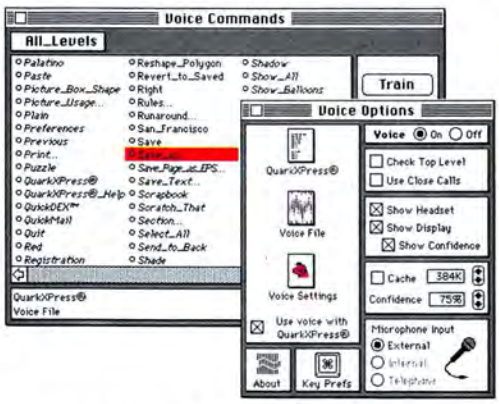


Up to Date . . .

Version 1.1 of **Resolve,** Claris' WingZ-based spreadsheet program, can read and write Excel 3.0 files directly, supports DAL/DAM and Brio Technology's DataPrism, and offers faster printing to PostScript printers. 408-727-8227. $399. ◎ **QuickLetter 2.0,** Working Software's handy letter-writing DA, includes envelope-bar-coding ability and the company's 93,000-word Spellswell spelling checker. 408-423-5696. $49. ◎ Enhancements in version 3.0 of **M.Y.O.B.,** Teleware's accounting package, include improved data importation and multilevel password protection and give you more flexibility in creating invoices and purchase orders. 800-322-6962 or 201-334-1154.

Speak Up: Your Mac Is All Ears

If you've ever wondered if there was a constructive use for the sound-input capability in the newer Macintoshes (other than for inflating file sizes with huge voice annotations or creating dumb beep sounds), ASI (Articulate Systems, Inc.) may have come up with an answer: voice recognition. The maker of the Voice Navigator II has just introduced Voice Navigator SW, a software package that makes any Macintosh with audio input on-board — the Classic II, LC II, IIsi, Quadra 700 and 900, and PowerBook 140 and 170 — voice-controllable.



Articulate Systems' Voice Navigator SW software lets you control your Mac with your voice and the audio-input capability that's built in to the Classic II, LC II, IIsi, Quadra 700 and 900, and PowerBook 140 and 170.

Voice Navigator SW is identical to the software that ships with the Voice Navigator II hardware package, so the process of setting up an application for use with voice is still a little complicated. Nonetheless, once an application has been set up, the productivity gains can be tremendous. Voice Navigator SW ships with languages for 75 leading applications. Users who buy now will be able to upgrade at no cost to ASI's revised software, which promises a significantly easier-to-use interface, when that package ships this fall.

Because the Apple microphone is omnidirectional and unsuitable for voice recognition, Voice Navigator SW ships with one of two microphones: a desktop model or a headset (especially useful for PowerBook users).

With the release of Voice Navigator SW, ASI also announced that it is cutting $200 from the list price of the Voice Navigator II, which will now list for $699.

Articulate Systems, Inc., 600 W. Cummings Park, Suite 4500, Woburn, MA 01801; 617-935-5656. $399.

Pivot for Less

Radius' Color Pivot monitor has been ideal for users who want an adaptable monitor. Unfortunately, at a price of $2,198 (including a video card), it's been out of reach for some buyers. So in keeping with the times, Radius has introduced a lower-priced model, the Color Pivot/LE.

Unlike the original Color Pivot, the Color Pivot/LE doesn't support Mac internal video, so you have to use it with a Radius Color Pivot Interface card. But even with the card, the system is $400 less expensive than the original Color Pivot.

The Color Pivot/LE can display 256 colors at a resolution of 832 x 624 pixels, which is identical to that produced by Apple's 16-inch color display. And the Color Pivot/LE costs $400 less than the Apple unit.

Radius will continue to sell and support the original Color Pivot.

Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; 408-434-1010. Color Pivot/LE, $1,199; Radius Color Pivot Interface, $599.

HP's Color Surprise

Would a RISC-based PostScript Level 2 color printer for less than $5,000 surprise you? Maybe not. OK, how about a RISC-based PostScript Level 2 color *paintjet?* Now *that's* surprising, but that's exactly what Hewlett-Packard has introduced: the PaintJet XL300.

The XL300 offers 300-dpi color printing on plain paper or on any of HP's special media, including glossy and coated paper and transparency film. It uses cyan, magenta, yellow, and black cartridges, so you don't have to worry about the registration problems associated with creating a process black for your text. It can print on a medium as large as 11 x 17 inches (B-sized), and because the medium enters and exits on the same side, the XL300 can fit on a bookshelf. To keep all that paint from smearing, the XL300 incorporates a heater that dries the print before it leaves the printer. Using HP's supplied software, you can adjust the heater to suit the medium you're printing on, a bit like adjusting the "doneness" setting on your toaster.

Intended for networked environments, the XL300 comes with Centronics parallel and LocalTalk interfaces and can automatically switch between the HP PCL 5C (the color implementation of PCL 5) and Adobe PostScript page-description languages. For faster networking, the XL300 accepts the same HP JetDirect interface cards used in HP's network laser printer, the IIIsi. An Ethernet interface will be available this summer.

The printer comes in either a QuickDraw version with 2 megabytes of RAM and 13 scalable fonts or in a PostScript configuration with 6 megabytes of RAM and the standard 35 Adobe fonts. An Intel 80960 RISC chip powers each printer, and HP predicts printing speeds of approximately 1 to 2 minutes per page for text and 1.5 to 6 minutes per page for graphics.

Hewlett-Packard Co., 19310 Pruneridge Avenue, Cupertino, CA 95014; 800-752-0900. $3,495; with PostScript, $4,995.



Hewlett-Packard's PaintJet XL300 offers users 300-dpi color printing on a variety of paper types, including plain bond and transparencies.

MacDraw Pro: Faster and Savvy

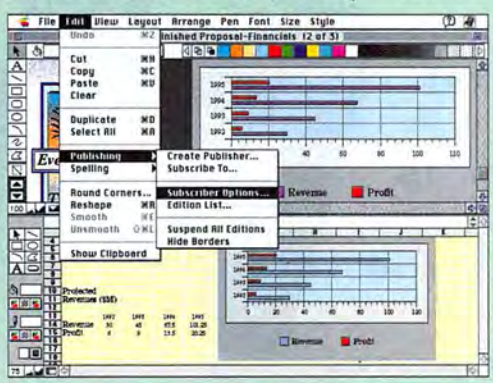
When Claris introduced MacDraw Pro last summer, two questions were immediately shouted from the audience: "Where's all the System 7 stuff?" and "Why is it so slow?" Claris took its lumps and licked its wounds and has now issued a version designed to answer those very questions.

Version 1.5 of MacDraw Pro is the first System 7-savvy version of the program. It supports publish-and-subscribe, Apple events, Balloon Help, and TrueType. You can also import QuickTime movies. The implementation of publish-and-subscribe is significant, because MacDraw Pro is the first object-oriented application we've seen that lets you choose what you're going to publish: either a layer or a whole object. Other drawing programs publish not only the object but also anything else that might appear within the bounded region the system publishes to the edition file.

As for speed, the new MacDraw Pro is faster than the previous version but how much faster depends on what you're doing and the complexity of your document. Still, Claris has paid special attention to text entry and printing, especially on non-PostScript printers, so you can expect to see significant improvements in that area. (Claris predicts speed gains of as much as four times for text entry and as much as ten times for printing.)

A few other improvements include the ability to select objects by color and the inclusion of a sample HyperCard 2.1 stack that lets you control a slide show composed of MacDraw Pro screens. Claris has also put some time into improving MacDraw Pro's memory handling as well as redraw and scrolling speeds.

Claris Corp., 5201 Patrick Henry Drive, P.O. Box 58168, Santa Clara, CA 95052; 408-727-8227. $399.



Claris' latest version of MacDraw Pro finally gives users all the System 7 features they've been expecting, plus improved performance. (Claris Resolve is shown at the bottom of the screen.)

Quadra Video Gains MultiSync Support

A Quadra's internal video is a great addition to any configuration, but if you own one of NEC's MultiSync FG series color monitors, you really haven't been able to take advantage of the display's capabilities, because there hasn't been a way to access its multiple resolutions — until now, that is. NEC has just announced a free software upgrade that lets users of FG color monitors switch resolutions on the fly while using a Quadra's internal video circuitry.

A control panel, NEC's software lets the 5FG (a 17-inch display) and the 6FG (a 21-inch display) switch among three resolutions and two refresh rates: 640 x 480 pixels at 67 hertz (Apple 13-inch timing), 832 x 624 pixels at 75 hertz (Apple 16-inch timing), and 1,152 x 870 pixels at 75 hertz (Apple 21-inch timing). Owners of the 4FG (a 15-inch model) can switch between 640 x 480 and 832 x 624 pixels.

NEC Technologies, Inc., 1255 Michael Drive, Wood Dale, IL 60191; 312-622-7427.

NewsLine

Reports and Analysis

Apple Lawsuit Finis?

SAN FRANCISCO, CA — In a ruling that effectively cuts the heart out of Apple Computer's multibillion-dollar "look and feel" lawsuit against Microsoft and Hewlett-Packard, U.S. District Judge Vaughn Walker ruled that most of the elements in Apple's suit were either covered under the company's 1985 licensing agreement with Microsoft or were simply not protected under copyright law. Walker's ruling left only a few interface items still in dispute. The remaining items include Hewlett-Packard's use of a trash-can icon in its NewWave interface and Microsoft's use of color, movable icons, and overlapping windows. Judge Walker was expected to rule on these remaining issues by the end of May, but the main battle over GUIs appears to be over. At press time, Apple hadn't announced any specific intention to appeal the ruling.

Microsoft Bags Fox

SAN FRANCISCO, CA — If you thought Redmond's software giant had enough feathers in its cap, then think again. Completing the triad of word-processing, spreadsheet, and database applications, Microsoft has announced its biggest acquisition ever: Fox Software. Microsoft exchanged 1.36 million shares of its common stock for all the outstanding Fox shares, putting the purchase price at approximately $173 million. Fox Software, maker of FoxPro, the dBASE-compatible cross-platform database-management program, will provide Microsoft with a significant boost in desktop database technology, offering serious competition to Borland International for the lion's share of the database-manager market. Microsoft still plans to release a relational-database manager (currently code-named Cirrus) for Windows in the second half of this year. Microsoft says that it will use parts of the FoxPro technology in the future to build new database engines that will work across various computer platforms. As part of the merger, David Fulton, the president of Fox, will join Microsoft to head up the database side of the company's newly formed Database and Development Tools division. Eventually, the Fox development team will relocate to Microsoft's headquarters in Redmond, Washington.



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HE SAID AS HE SCOOPED UP A HANDFUL OF FRESHLY MADE DISKETTES AND FANNED THEM LIKE A DECK OF CARDS. AT KAO, WE FEEL THE ONLY MEASURE OF PERFORMANCE IS PERFECTION. MAYBE THAT'S WHY WE'RE ALREADY THE USA'S #1 SUPPLIER OF DISKETTES TO THE OEM MARKET, WITH SUCH NOTABLE CUSTOMERS AS MICROSOFT® AND LOTUS®. AND MAYBE THAT'S WHY WE SHOULD BE YOUR #1 SUPPLIER OF DISKETTES AS WELL. FOR MORE INFORMATION CALL 1-800-759-2590.



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CIRCLE 120 ON READER SERVICE CARD.

The Quadra Turns 33

The top of the line has been topped! The 33-megahertz Quadra 950 is the fastest Mac yet.



Apple used to have a simple policy when it came to introducing new high-end CPUs: new high-end machine, new high-end price. But times have changed. The Personal LaserWriter NTR we told you about in May '92 (see "Personal Power," page 78) helped establish a new philosophy for Apple: higher performance, same price.

The Quadra 950 is the fastest Mac ever, beating the Quadra 900, which it replaces, by about 30 percent on average, but the best news is that the Quadra 950 costs exactly the same as the Quadra 900 does — in every configuration.

A Familiar Face

Although the Quadra 950 looks the same as the Quadra 900, Apple has made some significant internal improvements. The biggest change is the move to a 33-megahertz 68040 microprocessor, a chip that's a third faster than the 25-megahertz 68040 used in the Quadra 900 and 700. But Apple has done more than just swap chips. The I/O bus' clock speed has been increased from 15.66 megahertz to 24.28 megahertz, and Apple has installed a faster Ethernet chip, which it says can result in as much as a 20-percent performance improvement. Unfortunately, because of time constraints, we weren't able to check this claim.

In addition, the Quadra 950's VRAM is faster than that of the Quadra 900 (80 nanoseconds versus 100 nanoseconds), and there's more of it: The Quadra 950 comes with 1 megabyte of VRAM standard, which means you can get 16-bit color on Apple's 16-inch display and 8-bit color on its 21-inch model (the video circuitry also supports SuperMac's video timings). By increasing the VRAM to the maximum capacity of 2 megabytes, you can get 24-bit color on 16-inch monitors, but you still need a video card for 24-bit color on monitors larger than 16 inches.

The Quadra 950 has more storage and memory too. Unlike the Quadra 900, which came in an anemic 4-megabyte configuration, the Quadra 950 starts with an 8-megabyte/SuperDrive model. In fact, Apple has added 4 megabytes of RAM to

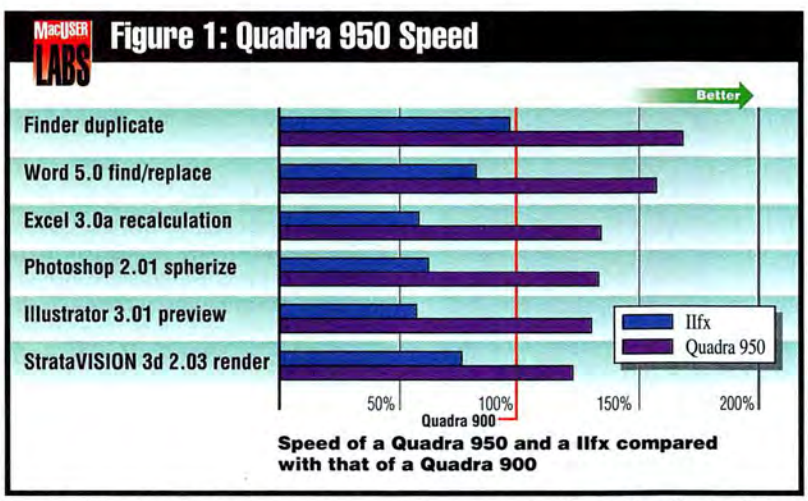


Figure 1: We performed our tests on 20-megabyte versions of a Quadra 950, Quadra 900, and IIfx and found that the Quadra 950 lived up to all of Apple's claims. It was consistently faster than the model it's replacing, and the 30-percent performance increase doesn't cost you a penny more.

PHOTOGRAPHY: ROSEMARY WILTON

every configuration that was available for the Quadra 900. Of course, those of you who are familiar with Apple's past RAM pricing are probably chuckling at the prospect of people paying Apple's ludicrous prices for RAM, but in this case, you can stop chuckling. Believe it or not, Apple isn't charging a premium for the additional memory — not one penny. Every configuration of the Quadra 950 costs exactly the same as the comparable Quadra 900 configuration, which is especially impressive when you look at the new hard drive Apple is introducing.

Instead of the 160-megabyte unit that Apple used to ship as its base Quadra 900 hard drive, you now get a faster 230-megabyte drive — but for the same price. The numbers break out like this: The 8-megabyte/SuperDrive model lists for $7,199; the 8-megabyte/230-megabyte hard drive, $8,499; and the 8-megabyte/400-megabyte hard drive, $9,199. An upgrade kit will be available, but as of this writing, Apple hadn't decided on the price.

Fast Times

In our tests of a preproduction model, the Quadra 950 performed every bit as well as Apple had predicted. In all of our application tests, we saw performance improvements of at least 20 percent over a similarly equipped Quadra 900. Although the Quadra 900 had the slower 160-megabyte drive and the Quadra 950 used the faster 230-megabyte drive, we found that the drive had no effect on the test results, other than the predictable impact in the Finder-duplicate test.

In the 5-megabyte Finder-duplicate test, the Quadra 950's 230-megabyte hard drive really shone. We found that it was nearly 70 percent faster than its 160-megabyte predecessor. Considering its performance, higher capacity, and identical price, the 230-megabyte drive represents an incredible value.

The Quadra 950's peak performance was in the Word find/replace test, in which it sped past its predecessor by more than 50 percent. The test results for the Excel recalculation, the Illustrator preview, and the Photoshop spherize were more consistent, delivering results that were on average 33 percent faster than those of the Quadra 900.

Lonely at the Top

Based on our test results, the Quadra 950 lives up to Apple's claims. It delivers significantly better performance than the model it's replacing, and it does so without costing one penny more. Considering that users are now being offered a more powerful machine that has more memory and a larger, faster hard drive — all for the same price — the Quadra 950 should be an easy choice for any high-end user. The Quadra 950 occupies a unique niche: It's the top in its class and offers outstanding value and performance. Apple has come a long way.

— Russell Ito

LOVE NEVER DIES

Luckily we live in a world where love never dies.
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DATA ANALYSIS

MUSE

With MUSE at the helm, exploring and analyzing reams of corporate data is no daunting chore.

If you're looking for a way to make sense of complex business data, MUSE may be the tool for you. MUSE blends elements of spreadsheet and database software into a unique program that lets you explore multidimensional data in a variety of ways. Not only does MUSE allow you to manipulate your data but its natural query language also lets you find the data you need, with a surprisingly simple ad hoc method.

Musing Over Data

MUSE's extraordinary flexibility makes it useful for the exploratory phase of data analysis — when you're not quite sure what you're looking for. By contrast, canned reports from traditional database programs generally offer too much or too little information at this stage.

Moreover, MUSE lets you analyze and manipulate your data without ever thinking in terms of traditional database reports or complex spreadsheet formulas. If you're a marketing manager, for example, you can import several spreadsheets containing multiproduct sales data and easily compare sales of one product line with another, or last year's sales with this year's sales of a particular line. MUSE accomplishes these tasks with ease; the same tasks in a traditional database or spreadsheet program would require users to expend considerable time and effort.

The most fascinating aspect of MUSE is its natural query language. In the previous scenario, the marketing manager could simply type, "What are sales for cashmere for Barney's for January?" MUSE is able to interpret such a query and provide the appropriate data.

Play by the Books

To acquire and manipulate data with MUSE, you work within five environments. You'll spend most of your time manipulating data in the WorkBook, which uses a spreadsheetlike row-and-column format. In corporate sites (the primary market for MUSE), WorkBooks generally acquire their data from DataBooks, MUSE's database environment, which stores data in tables. You can also import data into a WorkBook from spreadsheet programs in Excel 3.0, WKS, WK1, DBF, DIF, and SYLK file formats and from database programs in text-file format (fixed-field or comma-, tab-, or single-space-delimited).

The third environment is a script-writing window, in which you enter English-language queries and view the results. A charting window lets you chart data in a variety of basic 2-D, 3-D, and animated formats. The fifth environment is the program's dictionary, an internal language reference that enables MUSE to interpret your queries.

In addition to basic language elements, the MUSE dictionary includes definitions of virtually every unit of weight, measure, and currency on earth. If you want to know how much change you'll get back in lira if you pay for a $1.25 item with 50 francs, for example, MUSE can tell you (9,359.45 lira). You can beef up MUSE's query-interpreting powers by supplementing its central dictionary with your own context-specific dictionaries.

The Hard Part

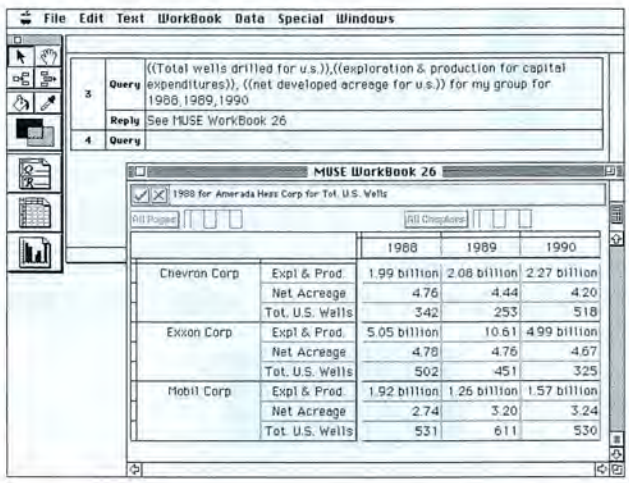
The ease with which you can acquire and manipulate data from within MUSE is impressive. However, getting data from your company's database into the program's DataBooks, where users can access it and pull it into their WorkBooks, is difficult. Typically, this process requires a good deal of planning and record organizing and at least the assistance, if not the total involvement, of systems professionals and consultants.

Organizations are likely to collect data in a central database; peel off summaries; and load them into MUSE DataBooks, which are made available on network servers (MUSE gives you the option of password-protecting sensitive company information). Corporations with SQL databases can take advantage of MUSE's Clear Access scripts, which let users load data directly into DataBooks from a mainframe database.

Several DataBooks can be open simultaneously and shared on a network. For this to occur, however, users must open DataBooks in read-only mode. The drawback to this approach is that when it comes time to update a DataBook, you have to bring down the entire system.

A powerful linking feature lets you create connections among tables in a single DataBook as well as among DataBooks themselves. By linking a table of sales data by city to a table of cities by sales region, for example, users can query MUSE to generate a list of sales by region. MUSE searches the DataBooks and answers simple queries in the script window.

More-complex data analysis occurs in the WorkBooks. Although WorkBooks outwardly resemble spreadsheets, their internal structure is quite different. Because row and column labels in MUSE define data categories rather than cells,

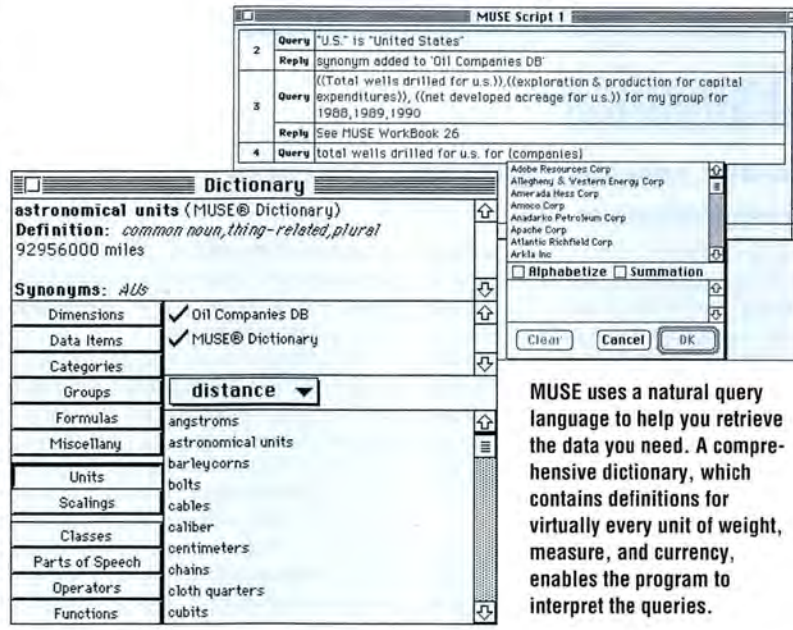


MUSE sets a new standard in flexibility for accessing and analyzing complex business data. The main work environment is the WorkBook, where you manipulate columns and rows to obtain multiple views of your data.

you can rearrange your data in a variety of ways simply by dragging rows and columns around.

Because WorkBooks are multidimensional, you can assign data to rows, columns, pages, and chapters. Each of these dimensions can be "primary" or "secondary," resulting in as many as eight dimensions per WorkBook.

English-language queries make data acquisition easy, but you must structure queries correctly. Fortunately, the syntax is straightforward, and MUSE's QuickStart, tutorial, and handbook do an excellent job of explaining the procedure. Designing complex queries that pull data out of multiple tables in a DataBook, however, is probably a task better left to developers, because syntax-related problems are likely to occur.



MUSE uses a natural query language to help you retrieve the data you need. A comprehensive dictionary, which contains definitions for virtually every unit of weight, measure, and currency, enables the program to interpret the queries.

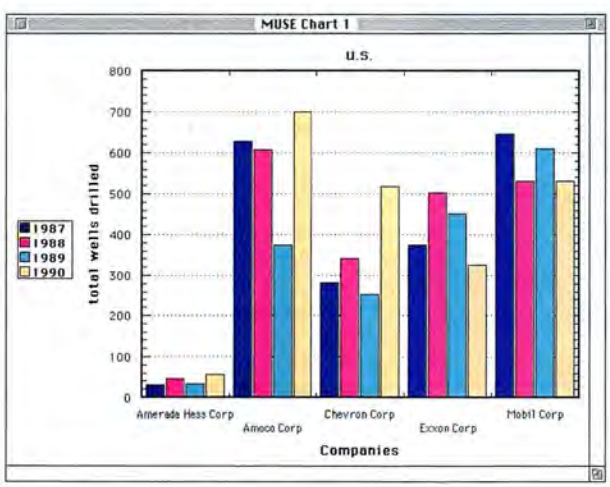
Confusing Quirks

MUSE provides a host of powerful features, but the program is not without its weaknesses. One is that text items are limited to 999 characters each — considerably fewer characters than the text fields in 4th Dimension and other Mac database programs are equipped to accommodate. This can cause problems if you try to import large text fields from these programs into MUSE DataBooks and WorkBooks.

In addition, several MUSE interface elements are a bit strange and confusing. Using brackets or braces around the name of a category as you create a query script causes MUSE to display a pick-list window that contains all the data items in that category, a valuable shortcut that saves you from creating a separate script for each category item. Unfortunately, the pick-list window doesn't indicate the category of information you're selecting. If the script isn't visible (and scripts are often covered by other windows), you can't always be sure what you're clicking on. Moreover, when you select pick-list items, the original query is altered, so you must reenter brackets or braces into the script before you can use the pick list again.

One of the program's most frustrating traits is its unconventional use of dimmed objects. In MUSE, they're frequently active, and the manual instructs you to use them, even though Macintosh interface guidelines dictate that dimmed objects are for indicating options that are not relevant in the current context.

MUSE is a strong tool for users, but from a developer's point of view, it needs improvement. The program limits an application designer's ability to completely automate tasks or to insulate the innards of a MUSE system from users. In addition, developers can't create their own buttons, entry screens, or menus.



In addition to data-access and -manipulation tools, MUSE provides a variety of basic 2-D and 3-D chart types.

The Bottom Line

MUSE is sure to open up new vistas to business users looking for a manageable way to access and explore corporate data. Once data has been properly laid out and organized in DataBooks, users can take advantage of a level of flexibility and ease of use that hasn't been available in traditional database and spreadsheet programs. With a bit of polish on MUSE's interface, Occam Research is guaranteed a winner.

— Louis Benjamin, Jr.

Get Info

MUSE

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Published by: Occam Research, 42 Pleasant Street, Watertown, MA 02172; 617-923-3545.
Version: 1.01.
List Price: $695.

PRESENTATIONS

Cinemation

Vividus' easy-to-use animation tool brings your presentations to life.

In the beginning, there was MacroMind Director, and it was good. But there was a catch. Director was impossible to use unless you invested a considerable amount of time and effort in learning to use the program. Enter Cinemation, a new tool for creating animated business presentations that's easy enough for novices to use, yet powerful enough to satisfy the needs of savvy presenters and trainers.

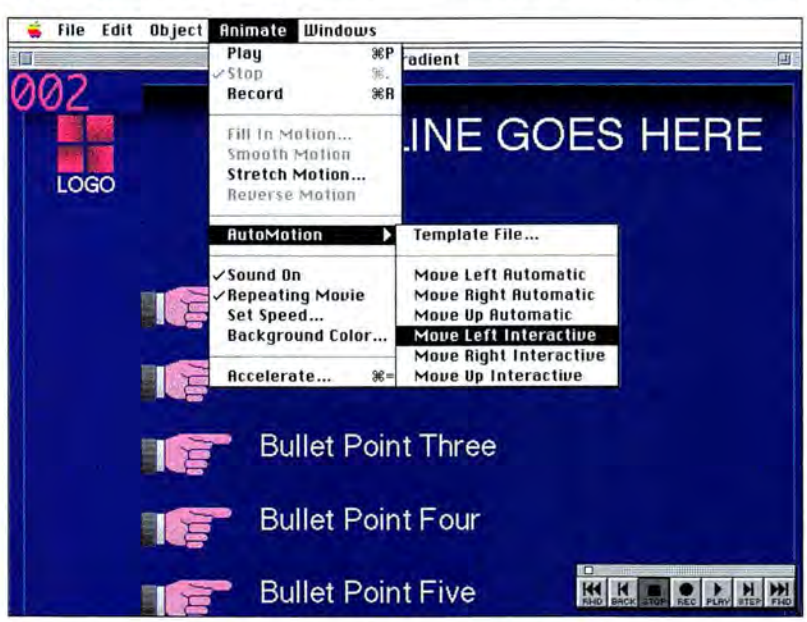
Making Movies

Cinemation takes its cue from the movies. It's a frame-based animator that combines motion, sound, and QuickTime video into interactive presentations and training materials. You edit your presentations with Cinemation's tools in much the same fashion as you would edit a film.

You can create presentations with Cinemation in one of two ways. If you're in a hurry and need to turn your work around in a matter of hours, you can use the AutoMotion feature to animate existing presentations from Aldus Persuasion or Microsoft PowerPoint. Simply import a presentation, select a Cinemation template, and activate a few commands. Cinemation does the rest.

The ability to work with existing Persuasion and PowerPoint files is especially useful if your organization has accumulated a substantial library of presentations created with these programs. No other multimedia presentation program, including Macromedia's Magic, comes close to this level of ease of use for creating simple animated presentations. Cinemation comes packaged with a variety of design templates, including backgrounds and borders, that you can incorporate into your animations by using the program's AutoMotion feature.

For more-original and more-sophisticated presentations, you can build movies from scratch, using Cinemation's excellent animation and painting tools. The program's clean and well-crafted interface makes this a fairly painless process. Unlike Magic, which constantly shuttles users among four different modes, Cinemation sticks to two modes — animation and painting.



With its ability to animate Persuasion and PowerPoint slides, Cinemation offers the fastest and easiest way to create simple but lively presentations. The package also provides a good selection of its own design templates.

Take One

You create your movies one frame at a time in the Movie window and edit them — either frame by frame or by ranges of frames — in the Filmstrips window. The Filmstrips window displays numbered thumbnail versions of each movie frame. To view the fruits of your labor, you play movies in this window, using the program's VCR-like Controls palette.

You can use Cinemation's painting tools to create objects for your movie, or you can import objects from other programs. Cinemation imports PICT, PICS, and QuickTime files as well as Scrapbook files from applications such as Persuasion and PowerPoint.

You can also attach sound to any object or frame in a movie, either by recording sounds with a Mac LC or IIsi microphone (Cinemation does not support the MacRecorder) or by importing snd resources and SoundEdit files.

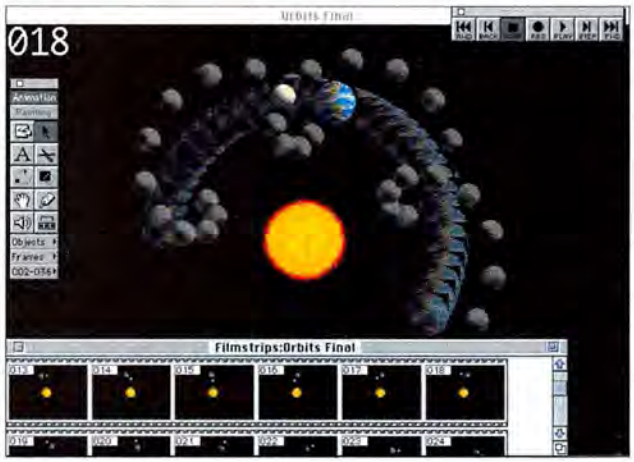
If the objects for your movies aren't already animated, as they would be in PICS and QuickTime files, you can use one of three animation methods to set them in motion. The easiest is to click on Cinemation's Record button and drag an object across the screen (you can smooth the action later). Alternatively, you can set a beginning and end frame for an object and have Cinemation fill in the motion between them, a method called tweening. The third and most advanced method — and which gives you the most control over your animation — requires you to work one frame at a time.

You can create motion by scaling, cropping, and rotating objects as well as by dragging them. To vary the rate of motion, you specify a percentage of inertia with the Fill In Motion command.

Control over the objects in your movies begins and ends with Cinemation's Tools palette, which you can toggle between the animation and painting modes. In animation mode, the palette provides tools for creating circular or rotating motion, moving all the objects in a frame, tagging (naming) frames and objects, adding sound to frames and objects, and creating links within or among movies. Pop-up hierarchical menus let you select named objects and frames.



Cinemation provides tools for creating fairly sophisticated animations from scratch. Here, we placed a QuickTime video in frame 1 of our movie and attached a link to the frame that allows the QuickTime video to finish playing before the movie goes to frame 2.



Cinemation's Ghosting feature displays grayed-out images from other frames, letting you align and trace objects precisely for more-professional-looking animations.

In painting mode, the Tools palette holds a paintbrush, a bucket, and a pencil as well as object tools, an eraser, a dropper for picking up color from the screen, a lasso, a marquee, a tool for creating custom-sized easels, and tools for creating patterns and fills.

Once you've put the pieces of a movie together, you can edit your presentation by cutting and pasting frames (including frames from other movies). Although you can't set movies to run for a specified duration, you can speed up and slow down the action by specifying the number of frames to run per second.

Ghostly Features

With the program's professional-level Ghosting feature, you can display grayed-out images from other frames within the frame you're working on, so you can align and trace objects for precise editing. This capability is particularly useful when you're creating animations frame by frame. Cinemation also lets you create movies within movies, allowing for some fairly impressive effects, such as a planet revolving around a sun as a moon revolves around the planet. You can even go a step further and import and place animated clips within the frames of your movies.

You don't have to use a programming language to make your presentations interactive either. Cinemation's link tool and a simple dialog box can turn any object into a clickable button that takes viewers to another frame in the same movie or to a different movie altogether. You can also program Cinemation to branch automatically to another frame as the movie plays. Branches can be set up so that they're one-way or round-trip, returning viewers to the frame they branched from.

The link tool also lets you create pauses and transition effects between frames. You can pause a movie at a designated frame for a number of seconds or until a specified event occurs. The package provides 20 transition effects in all, including fades, wipes, and reveals.

If you want to modify a movie, you can use Cinemation's Customize window to mix and match objects (objects can be images, text, movies within movies, and QuickTime clips) as well as change objects globally. You can maintain a library of movies and mix and match sections or entire movies to quickly create tailor-made presentations.

The Cinemation package comes with nearly 9 megabytes of AutoMotion and custom design templates, clip animations, music, and sounds. A selection of XCMDs allows you to play your movies back from within HyperCard and attach HyperCard scripts to buttons, and you can use CinePlayer, a playback utility provided with the package, to distribute your movies.

The Bottom Line

Although Cinemation isn't sophisticated enough to substitute for Director at the high end of the animated-presentation-program scale, it is a superior midrange tool for creating polished presentations quickly and easily. A few minor bugs mar Vividus' otherwise outstanding first effort; nonetheless, we found Cinemation easier to use than Magic, by virtue of its fewer modes and easier method for building transitions. Cinemation's performance is also better than Magic's for loading and playing movies, and the program's ability to animate Persuasion and PowerPoint slides is a real plus.

Overall, creating animated presentations has never been so easy, and even skilled professionals may find Cinemation a useful tool for fast prototyping of work destined for a more sophisticated program.

— Michael Miley

Get Info

Cinemation

★★★★½

Published by: Vividus Corp., 651 Kendall Avenue, Palo Alto, CA 94306; 415-494-2111.
Version: 1.0.
List Price: $495.

PAGE LAYOUT

PageMaker 4.2 and QuarkXPress 3.1

The Mac's two venerable page-layout programs play a game of catch-up.

If you believe imitation to be the sincerest form of flattery, then we've seen a lot of flattery in the world of Mac-based DTP lately. Both of the Mac's industrial-strength page-layout programs, PageMaker and QuarkXPress, have recently undergone maintenance overhauls that address some key weaknesses. Interestingly, each program has added several enhancements that mimic those of its rival. Overall, however, PageMaker retains its longtime edge for versatility and long-document processing, and QuarkXPress' strengths continue to lie in super-precise design tools and professional-level color handling.

PageMaker 4.2

Of the two programs, PageMaker seems the more eager to imitate its rival. QuarkXPress has supported color separation for some time, for example, but it's only with the current PageMaker release that Aldus has provided this capability as part of the PageMaker package. Version 4.2 has bundled with it Aldus PrePrint 1.51, an excellent stand-alone application (formerly sold separately) that's capable of separating PageMaker documents, most TIFF files, and PostScript files created in any application that supports the Open PrePress Interface.

But color handling aside, the hottest new PageMaker features include interruptible screen redraw, so you can modify pages over and over without waiting for the screen to refresh each time (QuarkXPress still doesn't offer this time-saving feature); the Control palette, for improved precision; links to other programs via System 7's publish-and-subscribe; and Aldus Additions.

PageMaker's new Control palette is similar to the Measurements palette in QuarkXPress. It lets you enter precise positioning and dimensioning information for selected objects. However, you can't use the palette to format text (as you can with QuarkXPress) or rotate objects, and its "nudge" arrows would be more useful if they didn't move objects in screen-pixel increments, which vary when you change the page view or your measurement system.

In addition to the powerful linking and automatic-updating features included in previous versions of PageMaker, the new System 7-savvy version lets you subscribe to an edition file in another graphics or word-processing program and then launch the source program from within PageMaker. Once you've modified the file and saved it, the linked file is updated in PageMaker. The new edition is then automatically imported into PageMaker. A specially implemented hot link for FreeHand 3.1 and ColorStudio 1.5 bypasses publish-and-subscribe altogether by using System 7's powerful IAC capabilities to directly modify and update graphics without an intermediate editions file.

Aldus Additions provide a way to extend PageMaker's capabilities in much the same way as do QuarkXTensions for QuarkXPress. However, the chief advantage of the Additions is that they include a simple scripting language that lets users as well as developers automate many of PageMaker's functions. QuarkXTensions, in contrast, are programming tools available only to licensed developers.

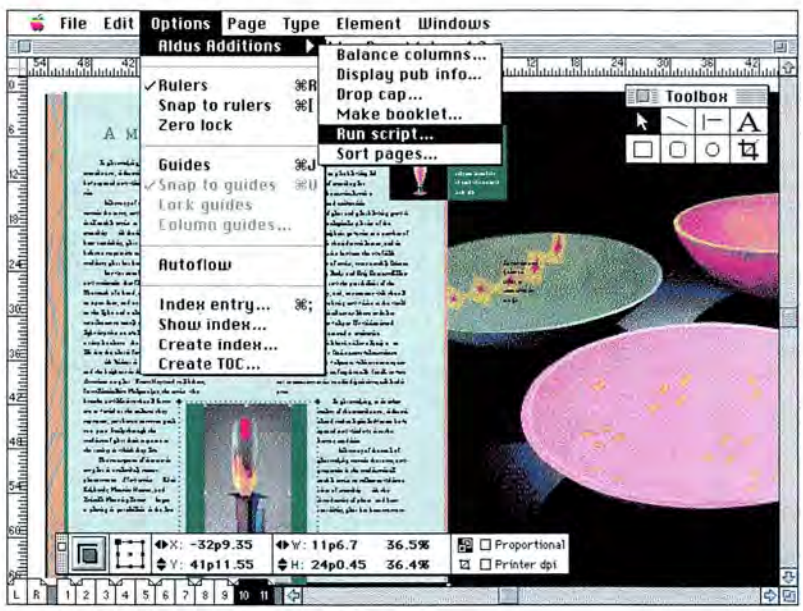
The PageMaker 4.2 package supplies a total of six Additions: Balance columns, Display pub info, Drop cap, Make booklet, Run script, and Sort pages. Most are useful, but all need further refinement, particularly Drop cap.

New indexing features further strengthen PageMaker's lead over QuarkXPress for long-document processing, because QuarkXPress still lacks any kind of facility for creating an index or table of contents. PageMaker 4.2 is 32-bit clean and Quadra-compatible.

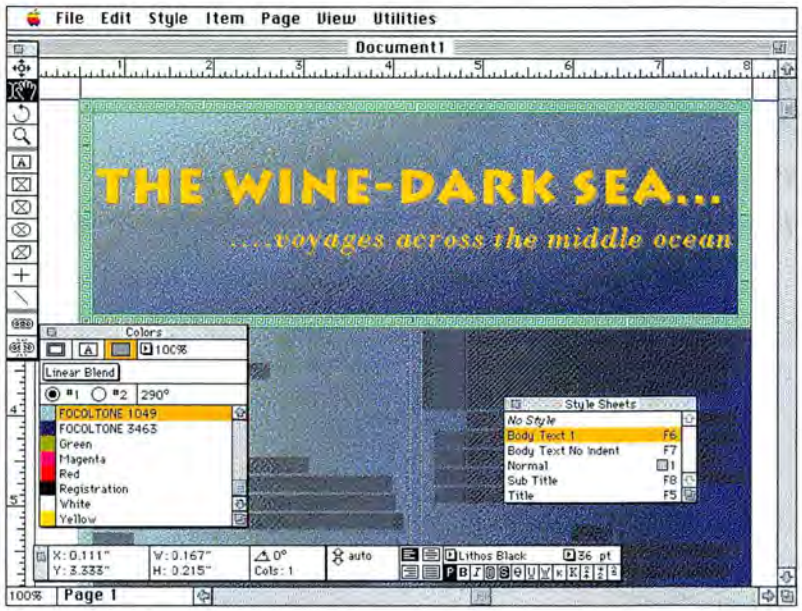
QuarkXPress 3.1

With version 3.1, Quark has upped the price of QuarkXPress from $795 to $895, but most users will find the program's enhancements make this version worth every penny.

The QuarkXPress Data file is dead, and no one is likely to mourn its passing. No longer does QuarkXPress create a



PageMaker 4.2 features a new Control palette for precise positioning and sizing of objects and Aldus Additions — six miniprograms that extend PageMaker's capabilities.



The new version of QuarkXPress features several interface enhancements, including the floating Style Sheets and Colors palettes shown here. The Colors palette lets you specify two-color blends for background colors.

separate file for kerning, tracking, hyphenation exceptions, and custom frame information that must be included with the documents you send to service bureaus — version 3.1 saves this information in the document files.

Many interface features formerly included in the Freebies XTensions are now built in to the program, including the page-grabber-hand tool and custom settings for pasteboard width.

Floating palettes for Style Sheets and Colors (an idea that originated in PageMaker) contain functions that were inconveniently scattered among a variety of menus and dialog boxes in the previous version. In addition, the Colors palette lets you specify a two-color background blend for text and picture boxes. However, although the Style Sheets palette is a great improvement, QuarkXPress style sheets aren't as easy to use or modify as PageMaker's.

Another improved interface feature lets you continue to view objects as you drag them across the screen, as you can with PageMaker — the previous version of QuarkXPress displayed only dotted outlines of objects as you dragged them. You can also select an object that's hidden behind another, a feature that PageMaker has included for years. In addition, enhanced layer control lets you move an object forward or backward a single layer at a time rather than simply to the back or front layer. Finally, the new Accurate Rulers feature is a very useful tool for dragging and resizing objects accurately, regardless of screen magnification.

Version 3.1 includes a variety of type enhancements. You can display a document's baseline grid and opt to snap objects to it and convert all your *fi*'s and *fl*'s to proper ligatures as you type them. And even though the character pair displays and prints as a single-character ligature, you can still click your insertion point between the characters and split them. You can even delete backward over the *i* or *l*, and QuarkXPress won't delete the *f*! Em-space width is modifiable, and you can justify a line comprising a single word.

For high-end users, QuarkXPress 3.1 provides superior trapping controls. Automatic trapping has been enhanced, and the Process Trap setting subtly traps each process color (cyan, magenta, yellow, and black) differently. Best of all, the new Trap Information floating palette lets you override settings on an object-by-object basis.

Although QuarkXPress 3.1 still doesn't separate RGB, TIFF, or PICT files, it can process CMYK TIFFs created by programs such as Photoshop 2.0. In addition, high-end publishers will be delighted with version 3.1's ability to import and separate Scitex CT image files, a feature that PageMaker and PrePrint currently lack.

QuarkXPress 3.1's System 7 support includes Balloon Help and the ability to subscribe to PICT edition files. As with PageMaker, you can modify files within a document by launching the source application, but QuarkXPress lacks PageMaker's slick hot-link implementation with FreeHand ColorStudio files. Like PageMaker 4.2, QuarkXPress is 32-bit clean and Quadra-compatible.

The Bottom Line

If you're in the market for a jack-of-all-trades publishing program, PageMaker 4.2 is just the ticket. Add version 4.2's significant enhancements to the program's superb indexing features, logical and powerful style sheets, and simple scripting language, and you have a well-rounded and powerful page-layout program with broad appeal. However, many of PageMaker's shortcomings remain. You're limited to one open document at a time, you must specify color tints by using inadequate and predefined ranges, you can't group page elements, and you can rotate text only in 90-degree increments (graphics can't be rotated at all!).

QuarkXPress 3.1, on the other hand, continues to be the high-end publisher's program of choice. Its precision tools for manipulating objects are unmatched, and its color handling is superb. It remains the Mac's premier professional-level page-layout program.

— Eric Taub

Get Info

PageMaker 4.2

tttt

Published by: Aldus Corp., 411 First Avenue S., Seattle, WA 98104; 206-622-5500.
Version: 4.2.
List Price: $795.

QuarkXPress 3.1

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Published by: Quark, Inc., 300 S. Jackson Street, Suite 100, Denver, CO 80209; 303-934-2211.
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GRAPHICS & DESIGN

StrataVision 3d

Strata's Eddy Award-winning 3-D-design package gains Bézier splines and enhanced rendering speed.

Among 3-D-design packages, StrataVision 3d is a standout for high-quality photo-realistic rendering. Version 2.0 added an elegant rendering interface and plug-in extensions that provide an almost unlimited upgrade path. With version 2.5, the most recent release, Strata has improved StrataVision's redraw and rendering speed and added a variety of important new tools for modeling, rendering, and animation.

A Better Model

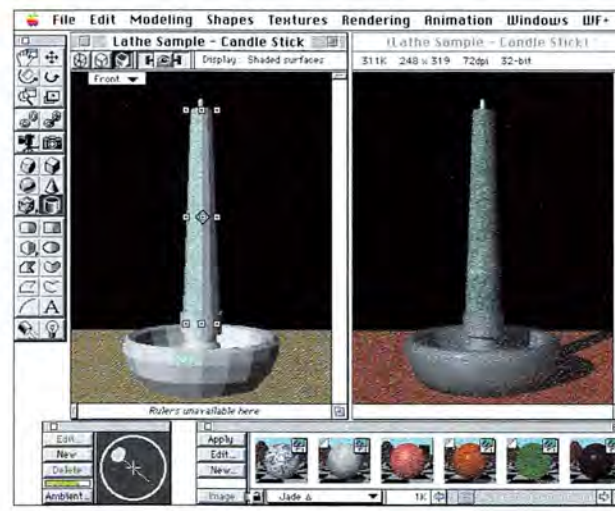
StrataVision provides separate tool palettes for modeling, lighting, texture application, and animation. Most work is done in the program's Modeling window, in which you build 3-D models and then apply textures and lighting. If your model comprises several individual objects, you can build each object in a separate window, but all components exist within the same file. You can draw 3-D objects in wire-frame or shaded views, and objects can intersect without requiring any special procedures. Essentially, rendered images are 2-D snapshots of 3-D models that "develop" in their own rendering windows.

To create smoother curves, StrataVision version 2.5 supports Bézier splines in its polygon-modeling environment. You can convert polygons to splines, using the 2D Reshape command in the Modeling window. Other objects, such as Type 1 and TrueType fonts, are created as Bézier splines, so text as well as other 2-D objects can be extruded to create 3-D objects.

Another new tool, the Skin Modeler, lets you wrap a surface around a series of cross sections called ribs. You can create your own ribs, using the program's 2D Sculpt window, or import them from programs such as Adobe Illustrator. The Skin Modeler can also create FlexObjects — 3-D objects that can twist and bend in animated sequences.

You set up your animations before you render images. StrataVision provides a variety of sophisticated animation techniques, including metamorphosis, which causes objects to change scale, proportion, and surface characteristics over time. The QuickTime and PICS animation formats are both supported for output.

StrataVision 3d's modeling environment works, but it's more difficult to use than that of Infini-D, a less-powerful 3-D design package from Specular International that features an exceptionally good interface. Fortunately, you can avoid



StrataVision 3d is renowned for its photo-realistic rendering capabilities. The image shown here was drawn in a simple shaded view (left) and then rendered (right). A portion of the program's excellent texture palette is displayed at the bottom of the screen.



Artists can use StrataVision 3d's advanced surface mapping and lighting tools to create new worlds. The scene shown here was created by Robin Miller, of Cyan, for an upcoming CD-ROM-based game.

modeling in StrataVision by importing objects in a variety of file formats, including PICT, TIFF, EPS, DXF, and IGES, and in native format from graphics programs such as Swivel Pro and MiniCAD.

StrataVision 3d excels in texture mapping, which gives objects the look of wood, glass, stone, or other materials. StrataVision offers surface maps as well as solid textures (these look as if they go all the way through an object). You can also create your own surface and bump maps, using imported PICT images.

New with version 2.5 is environment mapping, a feature that provides a variety of simulated environments (or you can create your own), which you map to reflective objects such as a glass bottle. This is a tremendously valuable shortcut, because it saves you from the time-consuming process of modeling complex scenes that serve no other purpose than to provide a reflection in the object.

To check the progress of your designs, you can render them in one of several preview or draft modes. All rendering can occur as a background task, so you can work with other applications as StrataVision processes your designs. You can also set rendering to occur at a specific time or interrupt it and save the results as a partial render. When you come back to the program later, the rendering will begin where it left off.

StrataVision gives you lots of options for controlling the rendering process itself. You can choose to turn on a slew of parameters, including anti-aliasing, glowing surfaces, shadows, reflectivity, and refraction. You can also choose among rendering algorithms, such as phong shading or ray tracing. StrataVision also offers radiosity, the slowest but most advanced rendering method.

The rendering process requires a lot of memory: too little can slow or even prevent rendering. The minimum memory requirement for StrataVision 3d is 4 megabytes of RAM, but the manual recommends at least 8 megabytes for optimal performance.

Rendering can be an extremely time-consuming process when large, complex images are involved. Strata is one of several companies that have recently developed a way to divide the rendering process among several Macs on a network. The company's Render Pro, which works with StrataVision 3d version 2.5, speeds the rendering process by dividing an image into hundreds of individual rendering calculations. The calculations are distributed among several Macs on a network and processed simultaneously in the background.

The Bottom Line

Unlike rival MacRenderMan, from Pixar, StrataVision 3d puts a friendly interface on texture-mapping and rendering. The addition of Bézier splines in version 2.5 greatly strengthens the program's modeling environment. It may take you a while to master StrataVision 3d, but the photo-realistic images it produces make it well worth the effort.

— John Rizzo

Get Info

StrataVision 3d

★★★★½

Published by: Strata, Inc., 2 W. St. George Blvd., St. George, UT 84770; 801-628-5218.
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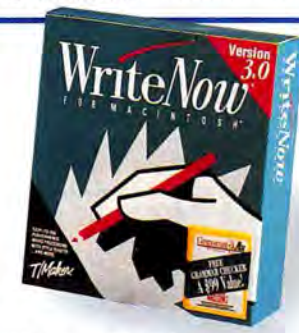
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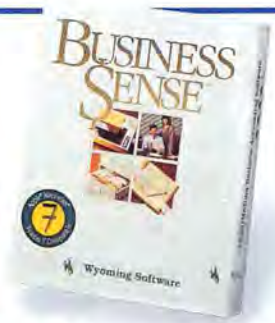
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Broderbund Software
3572 ❼Kid Pix 1.2 . . . . . 34.
1427 ❼The Print Shop 1.3.2. . . . . 35.
6281 ❼TypeStyler 2.0 *(with ATM)* . . . . . 126.
★Casady & Greene ... 30 day MBG
8879 ❼Fluent Font Library 4.05 . . . . . 99.
1945 ❼True Type Starter Set . . . . . 57.
★Claris ... 30 day MBG
1123 ❼MacPaint 2.0 . . . . . 86.
2518 ❼MacDraw Pro 1.01 . . . . . 275.
8007 ❼Claris CAD 2.0 . . . . . 599.
Custom Applications
8037 ❼Freedom of Press Light 3.03 *(17 fonts)* . 84.
★DeltaPoint ... 60 day MBG
3558 ❼DeltaGraph Pro 2.0. . . . . 199.
★Deneba Software ... 30 day MBG
3227 ❼Canvas 3.02 . . . . . 248.
★Expert Software ... 30 day MBG
4870 ❼Expert Color Paint 1.0. . . . . 29.
★Foundation Publishing ... 60 day MBG
9438 ❼Comic Strip/People & Kid Stuff . . . . . 71.



★Aldus ... 30 day MBG
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IDD/Innovative Data Design
2417 ❼MacDraft 2.1 . . . . . 279.
★Letraset ... 30 day MBG
4709 ❼LetraStudio 2.0 *(May '92)* . . . . . 139.
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Light Source
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Over 100 language fonts . . . . . call
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★MacroMedia ... 30 day MBG
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7441 ❼Swivel 3D Professional 2.0 . . . . . 479.
3450 ❼SwivelMan 1.0 . . . . . 619.
★Mainstay ... 30 day MBG
9798 ❼Capture 4.0 . . . . . 82.
★MicroFrontier ... 30 day MBG
3013 ❼Color It! 2.0 *(June '92)* . . . . . 73.
★MicroMaps ... 30 day MBG
7556 ❼MapArt *(PICT)* or 7555 *(EPS)* . . . . . *ea.* 89.
2791 ❼Global Perspectives 1.0 . . . . . 25.
6031 ❼MapPack: U.S. States by County . . . . . 25.
★Microsoft ... 30 day MBG
2878 ❼PowerPoint 2.01E. . . . . 245.
★Monotype Typography ... 30 day MBG
❼Monotype Imprints-TrueType . . . . . *ea.* 22.
Classic Fonts *(full line available)* . . . . . call
Postcraft International
2210 ❼Effects Specialist 1.04. . . . . 89.
2200 ❼Layouts PageMaker or 2414 QuarkXPress 69.
Quark
7612 ❼QuarkXPress 3.1 . . . . . 549.
★Specular International ... 30 day MBG
4962 ❼Infini-D 1.1 . . . . . 647.
3543 ❼Replicas *(vol. 1)* or 3675 *(vol. 2)* . . *ea.* 189.
★Spinnaker ... 30 day MBG
3530 Certificate Maker 2.02 . . . . . 22.
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7773 ❼Stratavision 3D 2.5 . . . . . 629.
★SuperMac Technology ... 60 day MBG
3380 ❼PixelPaint 2.1 . . 149. 5625 ❼Pro . . 459.
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6379 ❼Accents & Borders 1. . . . . 63.
4583 ❼Business 1 . . 63. 2003 ❼People 1 . . 94.
★Timeworks ... 30 day MBG
7115 ❼Publish It! *Easy* 2.1 w/File-It! . . *special* 89.
★T/Maker ... 30 day MBG
❼ClickArt *(7 bitmapped)*. . . . . *ea.* 38.
❼ClickArt *(5 EPS formats)*. . . . . *ea.* 82.
1858 ❼FaxMania *(birthdays - bulletins) special* 29.
★Virtus Corporation ... 30 day MBG
4488 ❼WalkThrough 1.03 . . . . . 309.

sunburns will sear.



After Hours Software
1352 ❼ *TouchBASE 2.0.1*–Multi-user database designed to keep track of personal and business contacts. It's a handy desk accessory that can print envelopes, labels, address books, fax cover sheets, reports, and much more ..... $79.

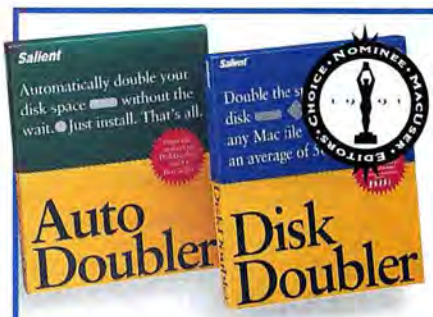
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★Abbott Systems ... 30 day MBG
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★Advanced Software ... 30 day MBG
8051 ❼Intouch 1.1 39. 9986 Network *(3-Pak)* 112.
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★Aldus ... 30 day MBG
5100 ❼Aldus SuperCard 1.6 ..... 195.
★ALSoft ... 30 day MBG
9808 ❼MasterJuggler 1.57B ..... 25.
9807 ❼DiskExpress II 2.11 ..... 49.
5204 ❼ALSoft Power Utilities 1.01 ..... 64.
★Alysis Software ... 30 day MBG
2687 ❼SuperDisk! ..... 49.
1608 ❼More Disk Space ..... 55.
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1074 ❼System 7 *(with free PCTV video)* ..... 99.
★ASD Software ... 30 day MBG
5 & 10 users packs available.
7085 ❼FileGuard 2.7 *(1 user)* ..... 138.
2552 ❼WindoWatch *(1 user)* ..... 91.
★Baseline Publishing ... 30 day MBG
7783 ❼INIT Manager 1.1 ..... 33.
3114 ❼INIT Info Pro 1.0 ..... 39.
★Berkeley Systems ... 30 day MBG
5737 ❼After Dark 2.0V ..... 28.
2198 ❼More After Dark *(M.A.D)* ..... 23.
2196 ❼After Dark & M.A.D. Bundle ..... 39.
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1593 ❼Drive 7 2.0 ..... 49.
1573 ❼DriveShare *(May '92)* ..... 89.
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8734 ❼HyperCard Development Kit 2.1..... 139.
★Connectix ... 30 day MBG
7830 ❼Maxima .. 45. 6647 ❼HandOff II .. 55.
★Dantz Development ... 30 day MBG
3393 ❼DiskFit Pro 1.0 ..... 72.
5255 ❼Retrospect 147. 7945 ❼Remote 1.3 264.
7946 ❼Remote *(10 Pak)* 147. 3112 ❼*(50 Pak)* 649.
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6653 ❼MenuFonts. 44. 7974 ❼ClickChange. 55.
★ElseWare Corp. ... 30 day MBG
4871 ❼Checklist 2.02..... 89.
★Fifth Generation ... 30 day MBG
4287 ❼PYRO! 4.01 ..... 27.
3955 ❼Suitcase II 2.0..... 53.
8286 ❼SuperLaserSpool 3.0 ..... 99.
5178 ❼FastBack Plus or 5725 ❼DiskLock *ea.* 125.
★FWB, Inc. ... 30 day MBG
2999 ❼Hard Disk Toolkit 1.1..... 125.
★ICOM Simulations ... 30 day MBG
6296 ❼Intermission 1.0 ..... 38.
3731 ❼OnCue II 2.0..... 55.



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9440 *MaccessCard Reader (reqs. FileGuard)*.. 299.
9439 ❼ *MaccessCard/FileGuard (1) Bundle*.. 399.

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6171 ❼MacPrint 1.3..... 92.
★Kensington ... 30 day MBG
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★Kent Marsh Ltd. ... 30 day MBG
9513 ❼FolderBolt 1.02..... 73.
1839 ❼The NightWatch II *(May '92)* ..... 89.
★Kiwi Software ... 60 day MBG
6267 ❼KiwiENVELOPES! 3.1.5 ..... 32.
3518 ❼Kiwi POWER WINDOWS ..... 50.
★Magic Software ... 30 day MBG
7267 ❼AutoSave II 26. 7270 ❼Backmatic 50.
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MicroMat Computer Systems
3732 ❼MacEKG II *(May '92)*..... 110.
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7068 ❼INITPicker 2.02 ..... 34.
2913 ❼Redux 1.63 or 2936 ❼HAM..... 49.
★Microsoft ... 30 day MBG
4471 QuickBasic 1.0..... 64.



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9767 ❼Reports 2.1..... 94.
2832 ❼Attributes 2.0 50. 2835 ❼Search 2.0 62.
★Now Software ... 30 day MBG
1793 ❼Now Up-To-Date 1.0 *(1 user)*..... 65.
2371 ❼*(5 user)*.. 259. 2366 ❼*(10 user)*.. 395.
6925 ❼Now Utilities 3.01 ..... 83.
★ON Technology ... 1 year MBG
6385 ❼On Location 2.0 ..... 75.
1566 ❼STATUS•Mac 2.0.2 *(unlimited)* ..... 749.
Palomar Software
8210 ❼PLOTTERgeist 2.0 ..... 249.
★Salient Software ... 30 day MBG
7404 ❼DiskDoubler 3.7.5 ..... 45.
4838 ❼AutoDoubler 45. 6092 *(10 pak)* 295.
★Symantec ... 60 day MBG
5176 ❼Symantec AntiVirus for Mac *(SAM)*.... 64.
5724 ❼Symantec Utilities for Mac *(SUM II)*.... 96.
6748 ❼Norton Utilities for Mac 2.0 *(May '92)*.. 95.
3421 ❼THINK Pascal 165. 2688 ❼THINK C 199.
9957 ❼THINK Reference 1.0..... 68.



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2462 ❼ *Citadel with Shredder 1.0*..... 89.
8562 ❼ *Complete Undelete 1.1*..... 48.

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★**Visionary Software ... 30 day MBG**
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3887 ❼First Things First 2.1 . . . . . 41.

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1423 Hard Ball II 31. 8220 ❼Jack Nicklaus Golf 34.
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3503 ❼Dark Castle 1.2 . . . . . 34.
3502 ❼Beyond Dark Castle 1.0 . . . . . 34.
★**Baseline Publishing ... 30 day MBG**
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6516 ❼The Playroom 2.0 *(CP) (color)* . . . . . 29.
❼Carmen Sandiego Series *(CP)* . . . . *ea.* 29.
5317 ❼Spelunx and the Caves of Mr. Suedo . . 29.
9804 ❼RoboSport or 8195 ❼BannerMania *ea.* 35.
5318 ❼Nigel's World . . . . . 35.
3559 ❼SimAnt . . 35. 8266 ❼SimEarth 1.1 . . 40.
4966 SimCity *(CP)* . . 29. 5871 ❼Supreme . . 47.
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5726 ❼Voyager 1.2 . . . . . 87.
★**Casady & Greene ... 30 day MBG**
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4960 ❼Fun Bundle *(includes Crystal Quest w/CE, Sky Shadow & Mission Starlight)* . . . . . 59.
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2707 ❼Puzzle Master . . . . . 26.
8525 ❼Casino Master . . . 39. 8524 *(Color)* . . 45.
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★**Davidson & Associates ... 30 day MBG**
3922 ❼Talking Spell It Plus . . . . . 29.
6128 ❼Math Blaster Mystery . . . . . 28.
2574 ❼New Math Blaster Plus . . . . . 34.
8278 ❼Alge-Blaster Plus . . . . . 34.
3923 ❼Personal Trainer SAT . . . . . 34.



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1303 ❼Loom 1.0 . . . . . 29.
8194 Armor Alley 1.1 or 5702 4D Boxing . . *ea.* 32.
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1894 ❼BattleChess *(3D animation)* . . . . . 29.
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3534 ❼Castles 1.0 *(June '92)* . . . . . 34.
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3272 ❼Super Solvers: OutNumbered! 1.0 . . . . 34.
3687 ❼Super Solvers: Midnight Rescue! . . . . . 34.
3281 ❼The Writing Center 1.0 . . . . . 51.
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7126 ❼Reunion 3.0 . . . . . 115.
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★**MECC ... 30 day MBG**
3963 ❼Oregon Trail 1.0 . . . . . 28.
❼Number, Word, or Super Munchers *ea.* 28.
★**MicroMaps ... 30 day MBG**
2784 ❼KidMaps 1.0 . . . . . 16.
★**Microsoft ... 30 day MBG**
2868 ❼Flight Simulator 4.0 *(CP)* . . . . . 42.



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6219 ❼ *Expert Astronomer 1.0*–Learn astronomy by displaying & printing the stars & planets from your location. View 9000+ celestial objects, track eclipses or comets. Perfect for novices or experts. Incl. *Introduction to Astronomy* guide. $29.

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8260 ❼Word Quest 2.1 . . . . . 30.
8257 ❼PreSchool Pack - Color 1.0 . . . . . 34.
2716 ❼Word Search Deluxe 1.04 . . . . . 34.
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7367 Space Quest III 34. 2522 ❼Space Quest IV 39.
3545 ❼EcoQuest *(May '92)* . . . . . 35.
2523 ❼King's Quest V . . . . . 39.
3549 ❼Police Quest III *(July '92)* . . . . . 39.
3552 ❼Leisure Suit Larry V . . . . . 39.
Sir-Tech Software
8229 ❼Bane of Cosmic Forge . . . . . 35.

your Connection's back



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3472 ❼Family Cards *(Solitaire, Rummy, War)* . . 49.
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★Strategic Studies ... 30 day MBG
2685 ❼American Civil War 1.0 . . . . . 29.
3287 ❼Warlords *(empires at war)* . . . . . 34.
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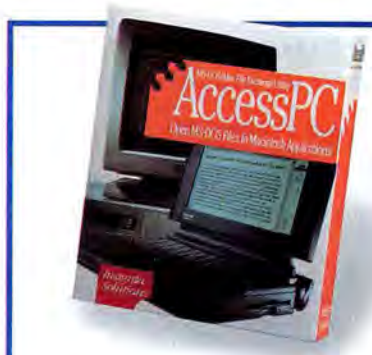
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6159 ❼MacroMind Accelerator 3.0 . . . . . 135.
5087 ❼MacroMind Director 3.1 *(May '92)* . . . 799.
2246 ❼MacroMind Three-D 1.0 . . . . . 999.
MASS Microsystems
2592 QuickImage 24 . . . . . 369.
Rival Monochrome Systems. . . . . *ea.* 1199.
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5009 MacFG 8-bit Card 799. 5018 24-bit 1699.
5021 Multisync 6FG . . . . . 2899.
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PCTV
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1805 20″ SuperMatch Color Display. . . . . 1799.
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4720 21″ Platinum Two-Display . . . . . 1099.
1877 Spectrum/8LC or 2026 S/8si . . . . . *ea.* 536.
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3924 ❼Shubert: "The Trout" Quintet CD . . . . . 39.
9322 ❼Voyager Videostack CD 2.2 . . . . . 65.

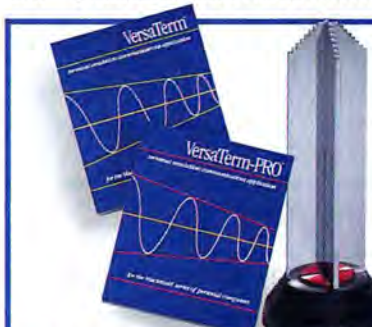
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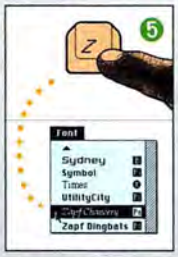
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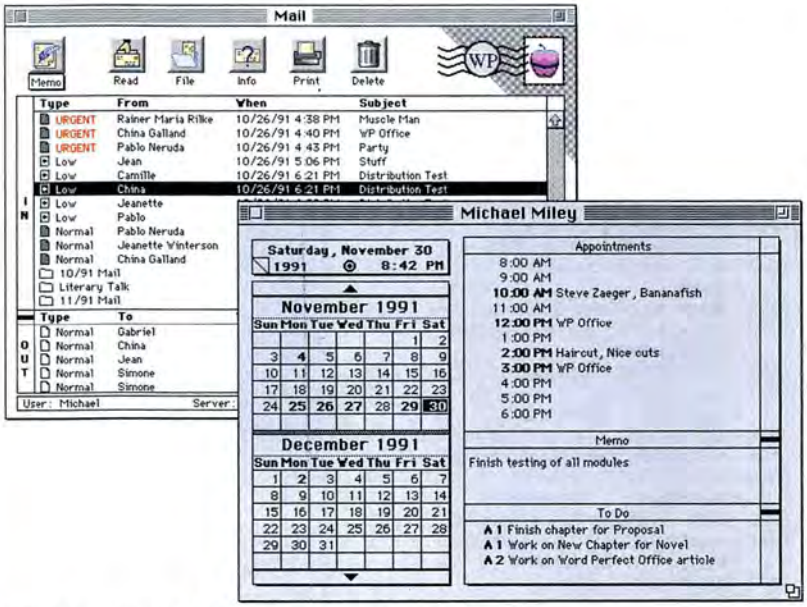
Office 3.0 (the Mac version's number matches that of its DOS counterpart, although 3.0 is the first version for the Mac) consists of five DAs: the groupware-oriented Mail and Calendar DAs and three single-user utilities. WordPerfect's recommended maximum number of users per Office Mail server is 100, and because Office can run in the background, you don't need a dedicated server.

Office's Administrator lets you manage and maintain Office from any Mac on the network, but we encountered a few problems. You can't perform administrative tasks while users are logged on to the system, for example. In addition, Office servers on the same network can exchange mail, schedules, and user lists, but only after a network administrator has registered them with each other manually and generated master lists at each server.

Mail

The core of Office is its Mail module. Mail efficiently stores single copies of messages on the server, no matter how many recipients are listed. Users manage their mail in an attractive, adjustable split-screen window that resembles the one in CE Software's QuickMail, in which incoming messages are listed on top and outgoing messages are on the bottom. Mail provides flexible message handling with numerous user preferences, including RSVPs with messages, delayed delivery, message-expiration dates, and the ability to modify the font and style of message text. The package also includes a spelling checker with a user-definable 80,000-word dictionary.

Mail's strengths include its integration



WordPerfect Office's Mail and Calendar modules are especially impressive, allowing users to share E-mail and schedules across mixed Mac and PC networks.

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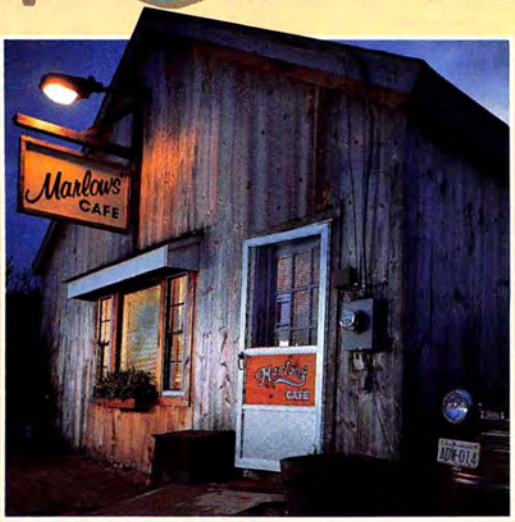
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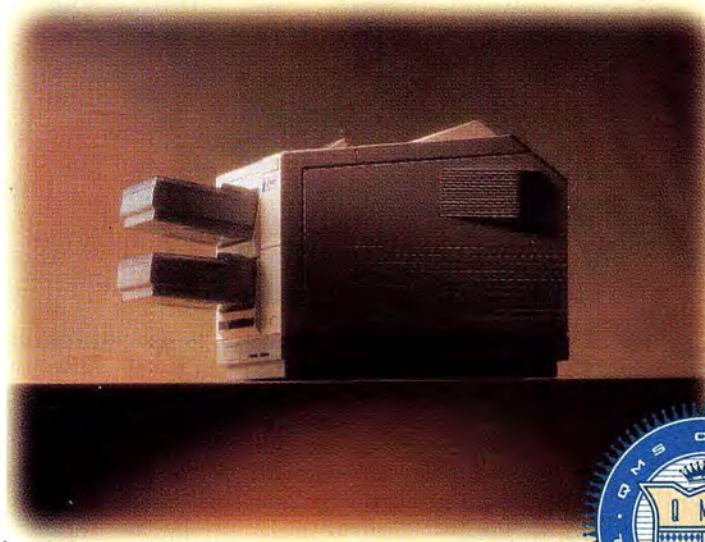
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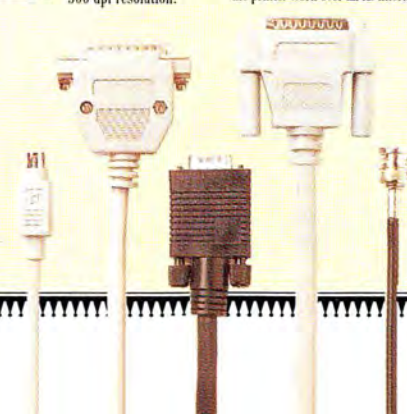
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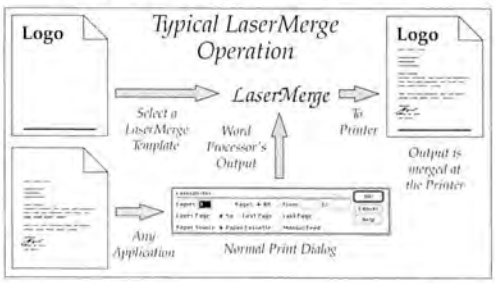
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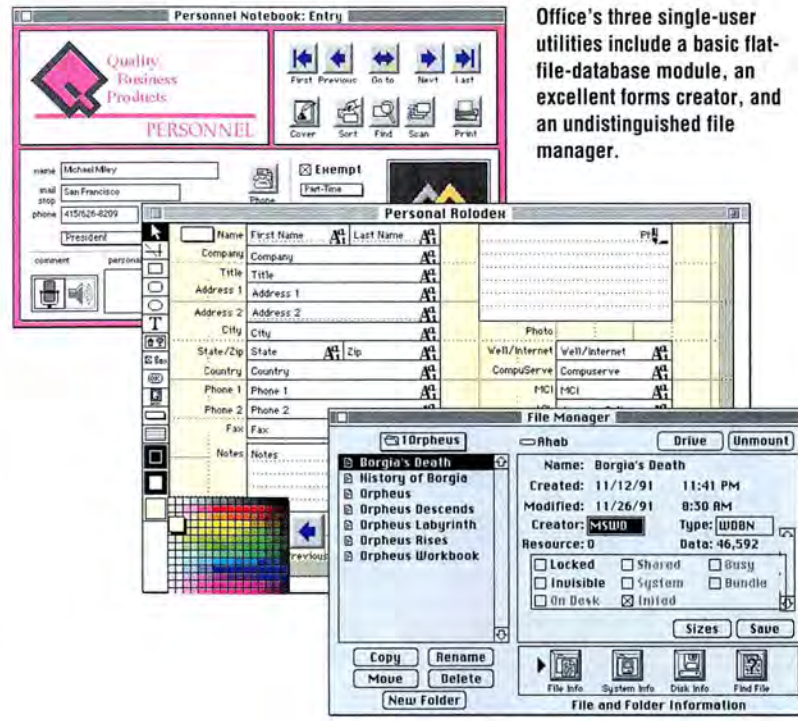
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CIRCLE 42 ON READER SERVICE CARD.



Office's three single-user utilities include a basic flat-file-database module, an excellent forms creator, and an undistinguished file manager.

with the Office Forms Maker. In addition, Mail provides a long list of useful extras, including an Unsend command for retrieving messages; a real-time broadcasting and conferencing system; support for multiple enclosures (as many as 99 files), including graphics and sound; and file security and encryption. Mail also has a deferred-send option for preparing mail on your PowerBook. As with most mail packages, users and administrators have the flexibility to set up personal and public groups on servers and individual machines.

Office Mail is not without flaws, however. As of this writing, it lacks Mac gateways to other E-mail systems — users must connect through the DOS version's server. In addition, when you attach files to messages, you can't enclose the entire contents of a folder with a single click, as you can with Microsoft Mail, and your most recent messages end up at the bottom of the In Box list.

Calendar

Calendar is Office's excellent group scheduler. It's easier to learn and use than ON Technology's Meeting Maker and is more full-featured than Microsoft's Schedule+. Calendar is well integrated with Mail — both use the same user list. Resources, such as rooms and equipment, can be added to user and group lists on the server and can be "owned" by specific users.

Calendar manages group scheduling with an In/Out dialog box that displays the meeting requests you've sent and received. To schedule a meeting, users select proposed attendees from the server's name list, add resources to the meeting request, and mail the request to the proposed attendees. Calendar's Busy at a Glance feature lets you see when prospective attendees are free to attend a meeting. Attendees can accept or reject meeting proposals, and once a meeting has been accepted, it's automatically entered into each user's calendar. With Auto Dates, you can set up recurring events in Calendar, but you must use WordPerfect's nonintuitive cryptic formulas and codes.

The Calendar module also serves as a personal scheduler, providing a memo pad, a to-do list, and reminder alarms. Unlike Meeting Maker and Schedule+, Calendar doesn't require your Mac to be connected to the server in order for you to access your personal calendar. You can save calendars to your hard disk, modify them, and merge them later with the server copy, which is especially handy for PowerBook users.

In addition to the primary calendar

window, which displays two months for date selection, an appointments list, a memo pad, and a to-do list, you can opt for weekly or monthly views to display your schedule in detail. You can also expand the calendar window to view two months (five months if you have a 20-inch monitor), and you can print your schedule in a variety of formats.

In addition to Mail and Calendar for network use, Office provides three utilities for individual use. Notebook is a single-user flat-file-database module that serves as a basic tool for building personal address books, but its bare-bones approach prevents it from competing with full-blown address-book managers such as TouchBASE. Forms Maker, however, is an excellent tool for creating forms for Office's Mail, Calendar, and Notebook modules. It provides a wider range of forms options than do QuickMail or Microsoft Mail, and it includes an assortment of drawing tools, lines, and shapes that you can colorize by using color palettes. File Manager is the least impressive module, offering basic controls (copy, move, rename, delete, and create) over files and folders as well as the ability to search for files by filenames or strings.

The Bottom Line

With its full-featured E-mail and group-scheduling modules, Word Perfect Office poses stiff competition for QuickMail and Microsoft Mail. Its E-mail capabilities compare well with those of the other packages, its group calendar is superior to the one in Schedule+ and is easier to use than ON Technology's Meeting Maker, and its Forms Maker provides more features than does Microsoft Mail or QuickMail. Particularly for Mac/PC networks, Office is an excellent choice.

— Michael Miley

Get Info

WordPerfect Office

$$$$

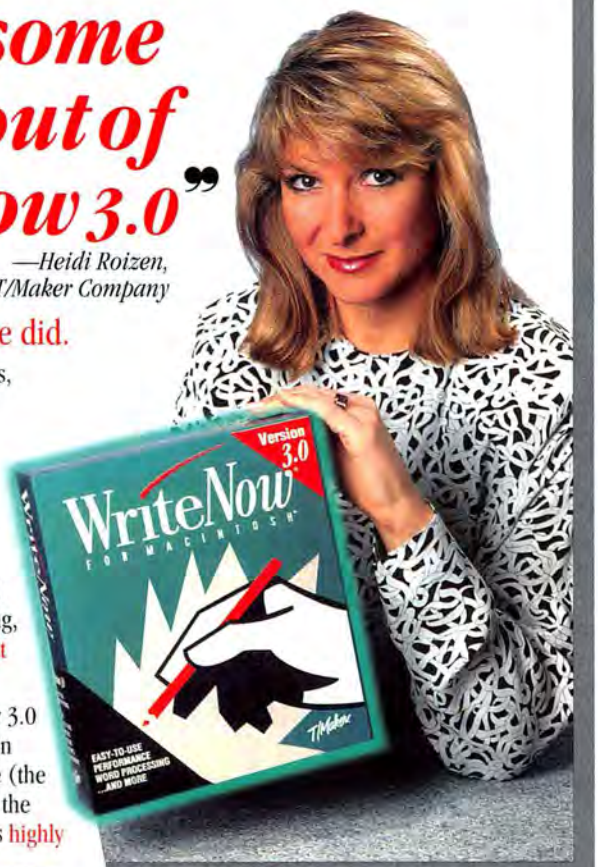
Published by: WordPerfect Corp., 1555 N. Technology Way, Orem, UT 84057; 801-225-5000.

Version: 3.0.

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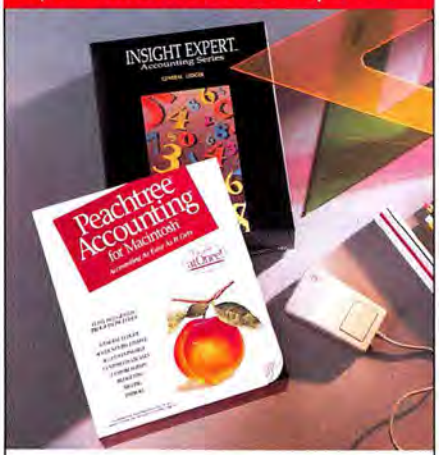
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CIRCLE 78 ON READER SERVICE CARD.

VIDEO

VideoSpigot

SuperMac's low-cost hardware/software package captures home video to QuickTime.

SuperMac has zeroed in on the burgeoning QuickTime market with the release of the VideoSpigot, an inexpensive QuickTime video-digitizing board that's taking the market by storm. And for good reason — street-priced at about $500, the VideoSpigot may be the best hardware bargain going for QuickTime videophiles.

Plug-and-Play

Prior to the VideoSpigot, frame-grabber boards such as the RasterOps 364 weren't optimized for capturing video in QuickTime format — in general, their frame rates were too slow or configurations that produced acceptable frame rates were complicated to set up. The VideoSpigot, however, was conceptualized as an easy-to-use, plug-and-play product for capturing video from any consumer video source in QuickTime format. Its frame sizes are tailor-made for QuickTime (the maximum capture size is 320 x 240 pixels in NTSC), it can handle NTSC as well as PAL video sources, and it's versatile enough to work with different window sizes (160 x 120, 240 x 180, and 320 x 240 in NTSC; 192 x 144 and 388 x 288 in PAL).

The VideoSpigot board comes in a variety of flavors: a Mac LC and IIsi version, a NuBus version, and a Pro version that's bundled with the SuperMac 24-bit PDQ display board. Also announced, but not yet available, is a bundle of the VideoSpigot with the Macromind-•Paracomp MacRecorder sound digitizer. For this review, we looked at the NuBus version of the board.

Installation is a snap — the board simply plugs in to any available NuBus slot, and the VideoSpigot extension drops into your System Folder. After you restart your Mac, you run ScreenPlay, software that's supplied with the board. It's a small, streamlined program that lets you preview incoming video and then record it to RAM or to disk once it's been digitized.

Finally, you attach your video source



The VideoSpigot is a low-cost digitizing board that lets you capture clips from consumer video devices and use them in your QuickTime movies. With the VideoSpigot's ScreenPlay software, you can grab frames to create still images.



ScreenPlay's Preferences dialog box lets you toggle sound recording, set the frame-grab rate, choose the still-frame document size, and designate a hard drive for storing clips captured with the VideoSpigot board.

to the VideoSpigot's composite video-in jack. The board lacks a higher-quality S-Video input capability, however. If you want to record sound, you'll need a sound digitizer such as the MacRecorder, or if you own an LC or a IIsi, you can use the built-in sound-recording microphone.

Video Capture

When your video source is connected, you select Play mode and the video appears in color within the ScreenPlay window (minus the sound). To record the video, you click on the ScreenPlay Record button and the video appears in gray-scale in a smaller window as it's captured directly into available RAM or to disk. You can increase the VideoSpigot's frame-capture rate by recording directly to RAM. A fast CPU such as a Mac IIfx or a Quadra or a fast hard drive can optimize the VideoSpigot's frame rate for record and playback. One thing missing from the record function is feedback on the amount of RAM or disk space you have available as the recording process takes place, although the software does display the frame rate of the recording.

You can adjust color and saturation (but not the brightness or contrast) of live or recorded video as well as crop QuickTime frames before saving movies to disk. The full range of QuickTime compression options is available, and you can set in and out points to save a portion of a video to disk. In the next upgrade to the ScreenPlay software, SuperMac plans to include a new codec (compressor/decompressor) that will improve the video frame rate and offer a larger window than is available with the standard QuickTime video codec.

The image quality of the VideoSpigot's captured video is quite good, considering the limited frame size and the effects of QuickTime compression. Although you can find hardware that supports larger QuickTime window sizes, be prepared to spend $6,000 to $10,000 for 640 x 480 thirty-frame-per-second QuickTime frame grabbers. On a price/performance basis, nothing comes close to the VideoSpigot for capturing home video to QuickTime.

The VideoSpigot's main drawback is that you can't change the sampling rate of the MacRecorder when you're working within ScreenPlay: The rate is always 22 kilohertz in mono. Although this is the highest-quality audio setting, it isn't necessarily the most desirable. To optimize QuickTime sound/video synchronization, you want to be able to digitize sound at 11, or even 7, kilohertz, which you can't do from within ScreenPlay. You can correct this problem with some painstaking postediting work (in Adobe Premiere, for example), but we hope to see this issue resolved in a future release of ScreenPlay.

The Bottom Line

Whether you're an amateur or a professional videophile, you'll find the VideoSpigot to be inexpensive, simple to set up, and convenient to use for capturing clips from consumer video devices to QuickTime format. If you're like us, you may find your hard disk filled with QuickTime movies within hours of installing the VideoSpigot — a testimony to its ease of use. Aside from a few problems with sound recording, the VideoSpigot is a compelling product that's well worth the asking price.

— David Biedny

Get Info

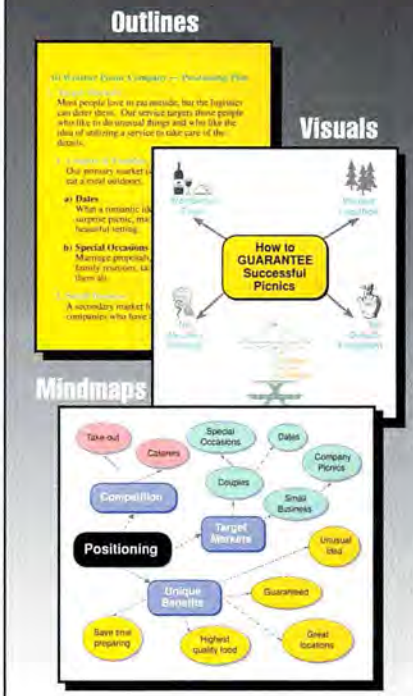
VideoSpigot

★★★★½

Manufactured by: SuperMac Technology, 485 Potrero Avenue, Sunnyvale, CA 94086; 408-245-2202.

List Price: VideoSpigot NuBus, $599; VideoSpigot LC, $499; VideoSpigot si, $499; VideoSpigot Pro NuBus, $1,599; VideoSpigot Pro si, $1,499.

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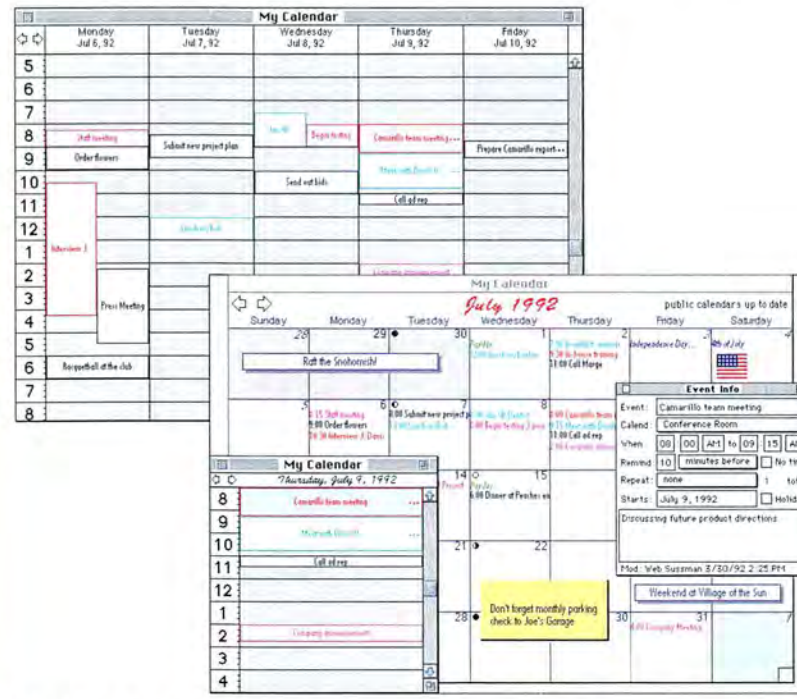
Now Up-to-Date scores high as a personal and workgroup appointment scheduler.

Riding the wave of success generated by its versatile utilities package, Now Software has come up with an ambitious entry in the calendar-software arena that promises to be every bit as successful as its Now Utilities. Now Up-to-Date is a full-featured but elegantly simple program that not only lets you schedule appointments and set reminders for your own personal schedule but also allows workgroups to schedule events over an AppleTalk network.

What distinguishes Now Up-to-Date (NUD) from other appointment-scheduling programs is its network strategy and superb interface. Unlike On Technology's Meeting Maker, for example, which was designed specifically as a workgroup scheduling program, NUD was built primarily as a personal scheduler that can also be shared over a network. As a result, unlike Meeting Maker, NUD doesn't require you to connect to a server to use the program. You can save a copy of your calendar to your PowerBook, for example, make changes while on the road, and then connect to the NUD calendar server when you return to the office and update your calendar.

In addition, although NUD is feature-rich, it's easy to learn and use. Its well-designed interface is intuitive and uncluttered, and even novice users can have the program up and running immediately. NUD comes closer than any other program currently available to mimicking the process of using a paper appointment book, but it has all the added software conveniences of easy updating, reminders, and workgroup sharing.

When you open NUD, the default view is of the current calendar month, but



Now Up-to-Date is a full-featured, elegantly designed personal and workgroup appointment scheduler that lets you view and customize calendars in a variety of ways. Pop-up boxes provide an easy way to view, enter, and change schedule information.

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you can also opt for a daily, weekly, or yearly view. To enter appointments, you double-click on a day and NUD pops up a scrolling page that lists the hours of the day. You click and drag through the duration of your appointment (3 P.M. to 4 P.M. for example) and type in its name. NUD handles event durations in 15-minute increments, beginning on the hour. When you return to your monthly calendar, you can see the time and as much of the event's name as fits on a single line in the date square.

If you want to enter details on an event, you can call up an Event Info box that lets you enter descriptive notes, set up recurring events, and add audible and visual reminders. Double-clicking on an event brings up the Event Info box that describes it. NUD even lets you schedule any number of overlapping events and display them graphically.

With NUD, it's easy to customize the look of your calendar. You can create and save various styles that define fonts, text styles, and text color for calendar headers, date numbers, events, and other elements. This feature makes it easy to set up visual indicators that tell you at a glance which events on your calendar are personal and which are business-related, for example. In the month view, you can also create banners to label events that span several days.

NUD supplies numerous printing options. You can print any of the on-screen views, and a wall-chart option spreads one view over 4, 9, or 16 sheets of paper. If you use an appointment book, NUD provides a wide range of formats, page sizes, and layout options for the DayTimer, DayRunner, Franklin Planner, and FiloFax.

With its ease of use, customizable features, and straightforward design, NUD shines as a personal scheduler. However, with a few minor exceptions, it also works well as a workgroup scheduler, allowing users on a network to set up and share public-event calendars that display such things as project schedules and staff meetings.

You use the Chooser to connect to a NUD calendar server. Once connected, you can create a new public calendar or view any of those that already exist. As you create new calendars, NUD allows you to password-protect them. You can set up two levels of security, one that controls who can view a public calendar and another that controls who can edit it.

You can subscribe to just one public calendar or to any number of the public calendars on a server. When you subscribe to a public calendar, NUD copies the events schedule from that calendar to your personal-calendar file. To ensure that your calendar is always up-to-date, you can leave your calendar file open in the background under System 7 and set NUD to poll the calendars you've subscribed to at regular intervals.

To enter an event into a public calendar you've subscribed to, you simply create it as you would any other event and then select the calendar you want to post it to from a list that appears in the Event Info box. To help you sift through all the event



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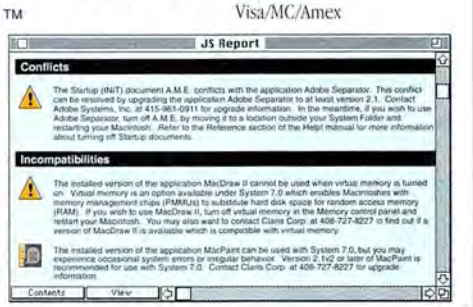
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information displayed in your personal calendar (it can add up, especially if you've subscribed to several calendars), you can use a different text color and style for each public calendar. Another handy feature lets you set NUD to mark with a bullet each new event you haven't read. When you elect to "unsubscribe" from any public calendar at any time, the events associated with that calendar are automatically removed from your file.

What makes NUD so versatile, especially for users who travel, is that it lets you save public events to your personal-calendar file, work with the file off-line (although you can't modify public events), and then reconnect to the server and have NUD automatically update your calendar with public-event information.

From a network administrator's point of view, setting up a NUD calendar server is a no-brainer: You simply drop an extension into the server's System Folder. The extension can run in the background on any Mac on the network. Once it's been installed, the calendar server requires no maintenance.

The flip side of NUD's minimal administration requirements is its lack of adequate access controls. Because serialization is handled at the application level rather than from the server, site administrators can't control which users and groups can access public calendars. Moreover, NUD lacks a warning device for flagging events that conflict with one another in public calendars.

The Bottom Line

To be truly useful to business users, a calendar program must succeed first as a personal scheduler and second as a network group scheduler. With its accessible interface, flexibility, and well-designed features, NUD works supremely as a personal calendar program, and it will have special appeal to users who frequently need to work with their calendar off-line. Its technique for automatically updating personal calendars when users reconnect to the server is a real plus.

NUD's network implementation is also noteworthy for its simplicity and maintenance-free design. Users will have no trouble deciphering the concept of shared public calendars, although administrators at large sites will find NUD somewhat lacking when it comes to adequate access controls. This drawback aside, NUD is the best business solution we've seen to date for managing busy schedules — both personal and shared.

— Susan Janus

Get Info

Now Up-to-Date

★★★★½

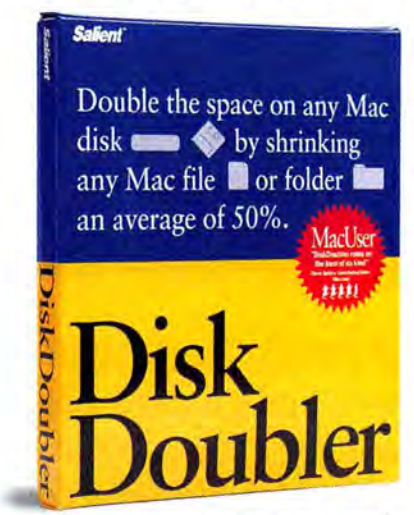
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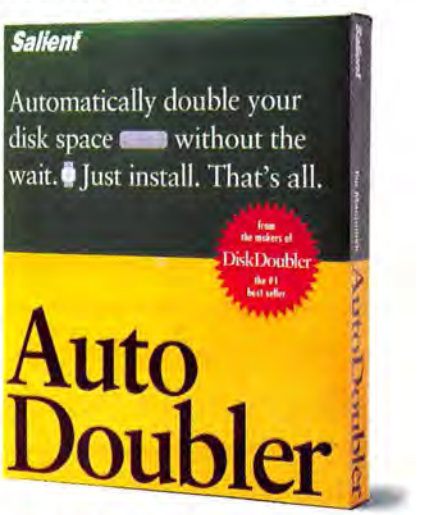
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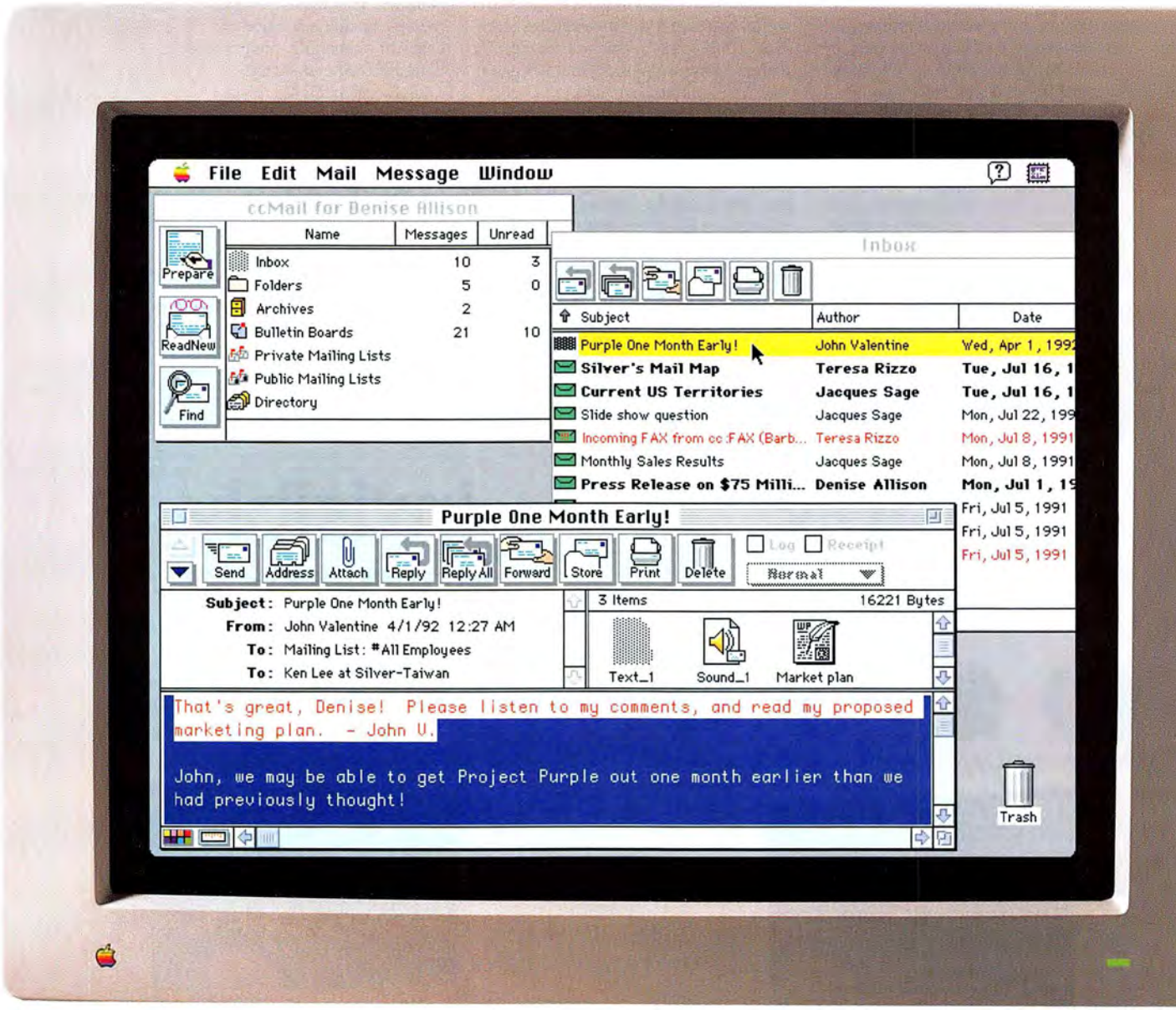


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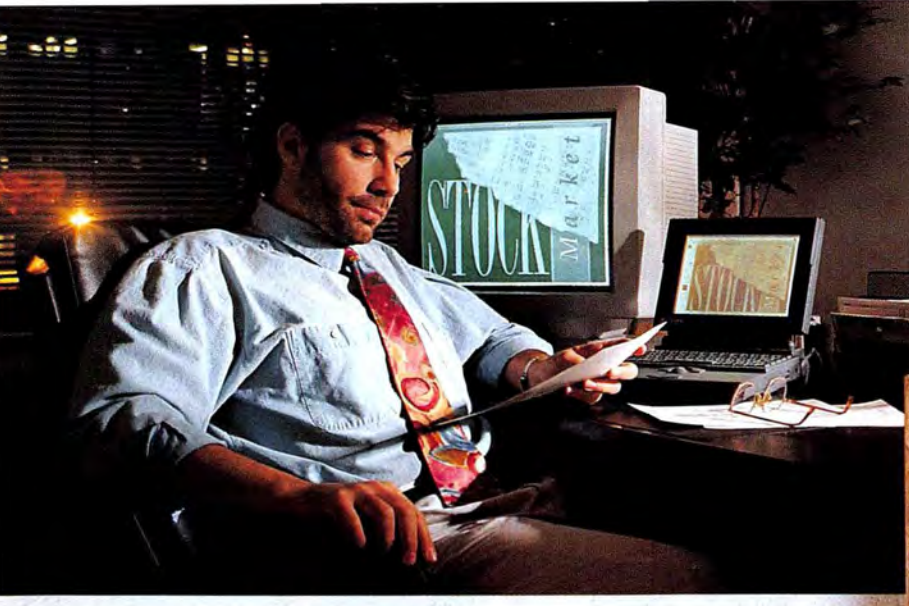
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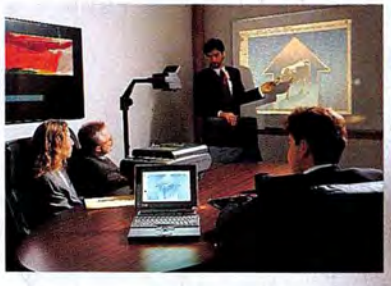




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QUICK CLICKS



MacGlobe

★★★½

If an atlas and an almanac are your favorite books, MacGlobe is for you. A sibling of PC Globe's successful product for the PC market, MacGlobe combines a database of information on 190 countries (which registered users can have updated yearly) with substantial map-creation and reporting capabilities at the country and regional level.

MacGlobe lets you create four types of maps for each country, although not simultaneously: a "base" map of the country's shape (it has population and area statistics as well as a picture of the country's flag), a city-location map, an elevation map, and a map showing geographic and tourist features. Political divisions below the country level, such as the boundaries of the French provinces, are not included on these maps. Pressing the Play button next to a country's base map produces a stirring, Nintendo-quality rendition of its national anthem.

When you create a map of a region, such as Europe, you can have MacGlobe "paint" it with as many as 15 colors or patterns to detail groups of countries that you select or that MacGlobe recognizes as economically, regionally, or politically related (such as the EEC, the OAS, or NATO).

You can use MacGlobe's comparison maps, charts, and reports to see variations among countries for 108 data elements such as economics, education, manufacturing, demographics, health, agriculture, mining, and energy production. (You can't, however, add your own data, such as sales figures, for different countries.) A comparison map for any one of these elements paints countries that have different value ranges with specific patterns — for example, a solid color for a country with a high population value and dots or stripes for countries with lower values. You can also create bar charts for the 10 lowest (or highest) values for a data element or for the values for 11 countries you select.

MacGlobe's export capabilities and printing features are weak. The Copy function, which provides the only means of exporting data, allows you to copy only a small subset of data at a time. For example, exporting energy-production data for all the countries in a region, such as Africa, is a laborious task that's best done with paper and pen. Printing in MacGlobe can be very slow, unless you disable Adobe Type Manager.

MacGlobe's cartography isn't completely current — the program doesn't reflect the breakup of the USSR, for example — and it contains some minor misnomers such as United Germany instead of the Federal Republic of Germany. Ideally, subscribers to MacGlobe's yearly update service should receive corrections in these areas.

Aside from these drawbacks, MacGlobe is a polished product. It offers excellent value for the K – 12 education market, for interested home users, and for business professionals looking for a compendium of relevant worldwide information (and for those with more local interests, PC Globe recently released a similar product called MacUSA).

PC Globe, Inc., 4700 S. McClintock, Tempe, AZ 85282; 602-730-9000. Version 1.0. $69.

— Jeffrey Steinberg



MasterJuggler

★★★★



Suitcase II

★★★★½

If you think System 7 gives you the ultimate in easy resource management for fonts, DAs, Fkeys, and sounds, you haven't used MasterJuggler or Suitcase II — both of which now support System 7. Since their introduction, MasterJuggler and Suitcase II have been leapfrogging each other in the competition to be the best in this field. At the moment, Suitcase II is ahead.

A resource-management utility is a boon to anyone who's operating with more than just the standard system resources. With either MasterJuggler or Suitcase II, you can take fonts, sounds, or Fkeys out of your System file and organize them into folders. Furthermore, each utility lets you load only the resources you need for your current project, so your font and DA menus are less cluttered and your applications launch more quickly; compresses font and sound files, which conserves valuable hard-disk space; and offers on-the-fly transparent decompression.

Like earlier versions, MasterJuggler 1.57 provides a variety of additional features; some are entertaining, others are time-savers. For example, you can assign sounds (such as Curly of "The Three Stooges" saying he's "tryin' to think, but nothin's happening") to several different Mac operations. You can also link applications and then launch them with one command.

Suitcase II 2.0 is a more substantial upgrade and edges out MasterJuggler in its ease of use. This new version introduces a menu bar that has a standard Edit menu and a special Suitcase II menu that lets you access the two windows where you make all your modifications. This ultraconvenient two-window scheme is Suitcase II's greatest advantage over MasterJuggler; MasterJuggler's features are scattered across several windows that you have to, well, juggle. Even with its handy pop-up menus, MasterJuggler can't match the elegant simplicity of Suitcase II.

Another of Suitcase II's improvements is its new Sets feature, which lets you group suitcases into logical sets so you don't have to remember each suitcase you need for a particular project. Although both MasterJuggler and Suitcase II resolve name/ID conflicts, Suitcase II includes an easy way to avoid font conflicts when you open your files on another Mac.

Suitcase II's documentation and HyperCard tutorial are superb, guiding you in plain English through the maze of TrueType versus PostScript fonts, System 7 resource management, and Suitcase II's operation. You don't have to read everything, but it's all there if you're curious.

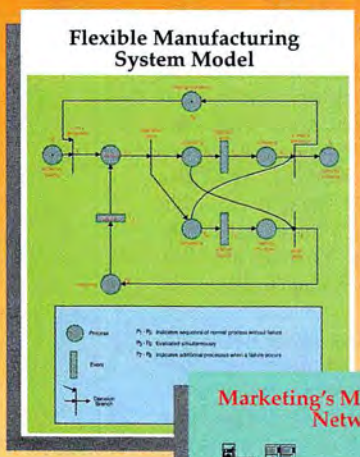
Both Suitcase II and MasterJuggler are excellent utilities. The features in MasterJuggler are substantial, and if you're also in the market for disk-management and data-recovery utilities, you can get MasterJuggler as part of the ALSoft Power Utilities package ($129). But for the greatest ease of use in resource-management packages, this time the nod goes to Suitcase II.

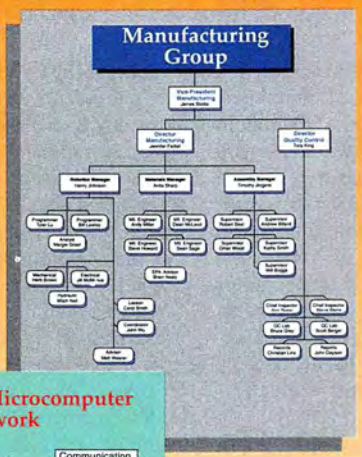
MasterJuggler, ALSoft, Inc., P.O. Box 927, Spring, TX 77383; 713-353-4090. Version 1.57. $49.

Suitcase II, Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; 800-873-4384 or 504-291-7221. Version 2.0. $79.

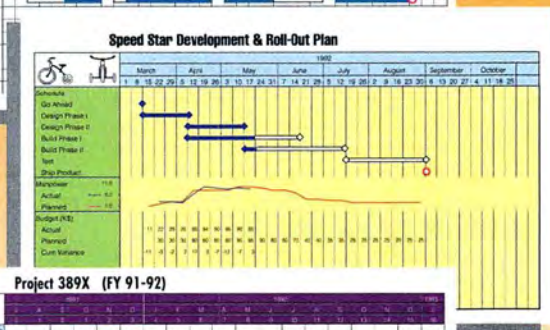
— Shelley Cryan

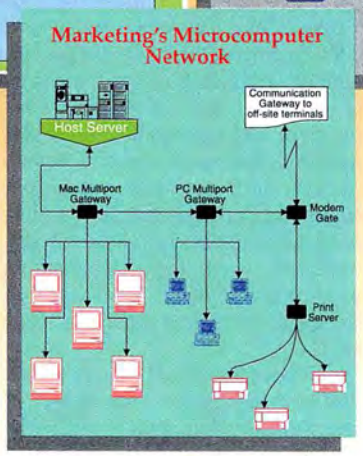
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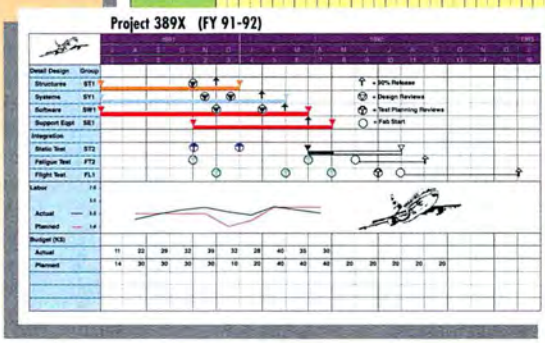












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MultiPort

★★★★½



QuadraLink

★★★★★

The two serial ports on the back of most Macs are sufficient for connecting a modem and a printer or network, but if you also want to connect other serial devices such as digitizers, bar-code readers, and label printers, you'll need some hardware help. Silicon Valley Bus Company's MultiPort and Applied Engineering's QuadraLink each provide a way to get four extra connectors so you can use as many as six serial devices simultaneously.

Although they provide similar results, the two products use different approaches. The QuadraLink occupies an internal NuBus slot, cleanly adding four 8-pin mini-DIN RS-422 serial connectors to the Mac's back panel. The MultiPort is an external device that plugs in to the two serial ports and an ADB (Apple Desktop Bus) port on your Mac — giving you six new serial ports and four ADB ports. Three hard-wired 5-foot cables give you room to move the MultiPort to where you can access it easily, but they can create a rat's nest on your desk.

To access the extra ports, you either need the Mac's Communication Toolbox (built in to System 7 and available from Apple as a free INIT for System 6) and software that supports it or you need a way to fool the Mac. For programs that don't support the Communication Toolbox, the QuadraLink and the MultiPort each come with "shadowing" software that makes extra devices appear to be connected to one of the Mac's standard serial ports.

For switching among your serial devices, the QuadraLink comes with a control panel called AE Shadow. Just click on the port you want and specify which of the Mac's standard ports you want to emulate (the modem port or the printer port). For easy reference, you can rename the extra ports to specify the connected devices. The MultiPort comes with a DA that works much the same way. With the MultiPort, you can tell which ports are currently selected by looking at the LEDs on the device's front panel.

An optional feature of AE Shadow lets you share connected devices with other users on your AppleTalk network — effectively turning single-user devices, such as the Apple StyleWriter, into networkable devices. This option costs $100 for the first five users and $49.95 for every five thereafter.

The MultiPort lets you share devices with other Macs in a more limited fashion, using direct serial connections rather than a network. With this method, you give up one of your extra ports for each Mac with which you want to share devices, and all the Macs must be in close proximity.

However, the MultiPort offers something the QuadraLink doesn't: four additional ADB ports. Although the standard ADB can address as many as 16 devices, Apple discourages daisy-chaining more than 3, because of connector resistance and signal degradation. The MultiPort overcomes this limitation with an optional $39.95 power supply. You don't need this supply to use the extra ADB ports, but if your total power consumption on the bus is too great, you'll risk blowing a fuse in your Mac.

Deciding between the QuadraLink and the MultiPort is tough, because they work similarly and come from companies with good reputations. If you want to reduce cable clutter or share devices with networked Macs, the QuadraLink gets the nod despite its higher cost. However, if you want the extra ADB connectors or easier access for switching devices and can overlook its excess cabling, the MultiPort is an excellent value.

QuadraLink, Applied Engineering, P.O. Box 5100, Carrollton, TX 75011; 214-241-0055. Version 1.0.1. $299.

MultiPort, Silicon Valley Bus Co., 22546 Summit Road, Los Gatos, CA 95030; 408-353-6600. Version 1.0. $169.

— Owen W. Linzmayer



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program's operation is completely automatic and transparent. The icons, type, creator, and speed of compressed files are identical to those of the uncompressed versions, but their size is smaller.

Previous compression software always wrote an uncompressed version of a compressed file elsewhere on-disk before opening the compressed file. The wait was painful, especially for large applications. AutoDoubler, in contrast, decompresses files directly into RAM, so they open almost as quickly as the uncompressed versions do. When you save a previously compressed document, AutoDoubler writes it uncompressed and compresses it later, when your keyboard and mouse are idle.

AutoDoubler installs as a control panel. At startup, it reserves a RAM cache in which to do its work. If RAM is at a premium or if you routinely compress very large files, you can tweak the cache size.

AutoDoubler gives you various means of controlling the extent and frequency of compression. You can exclude volumes, folders, and files from compression or limit compression to files that are older than a specified date. You can also specify a target percentage for the free space you want to keep on your volumes, and AutoDoubler will stop compressing when it reaches that limit. To prevent compression from kicking in at any idle moment, you can specify a time interval after the last keyboard or mouse activity before AutoDoubler begins working.

In testing, we found that AutoDoubler sometimes prevented subsequent extensions and control panels from loading. You can sidestep this problem by forcing AutoDoubler to load last, either by using an INIT-management utility, such as INITPicker, or by adding a tilde before AutoDoubler's name.

For stretching hard-disk space, AutoDoubler beats DiskDoubler and SuperDisk. It's faster than either program, and it's completely automatic. However, AutoDoubler doesn't let you select a file and compress it onto another disk for sharing with someone else — for that purpose, you still have to use DiskDoubler, StuffIt, Compactor, or SuperDisk.

Salient Software, Inc., 124 University Avenue, Suite 300, Palo Alto, CA 94301; 415-321-5375. Version 1.0.4i. $79.95.

— Darryl Lewis

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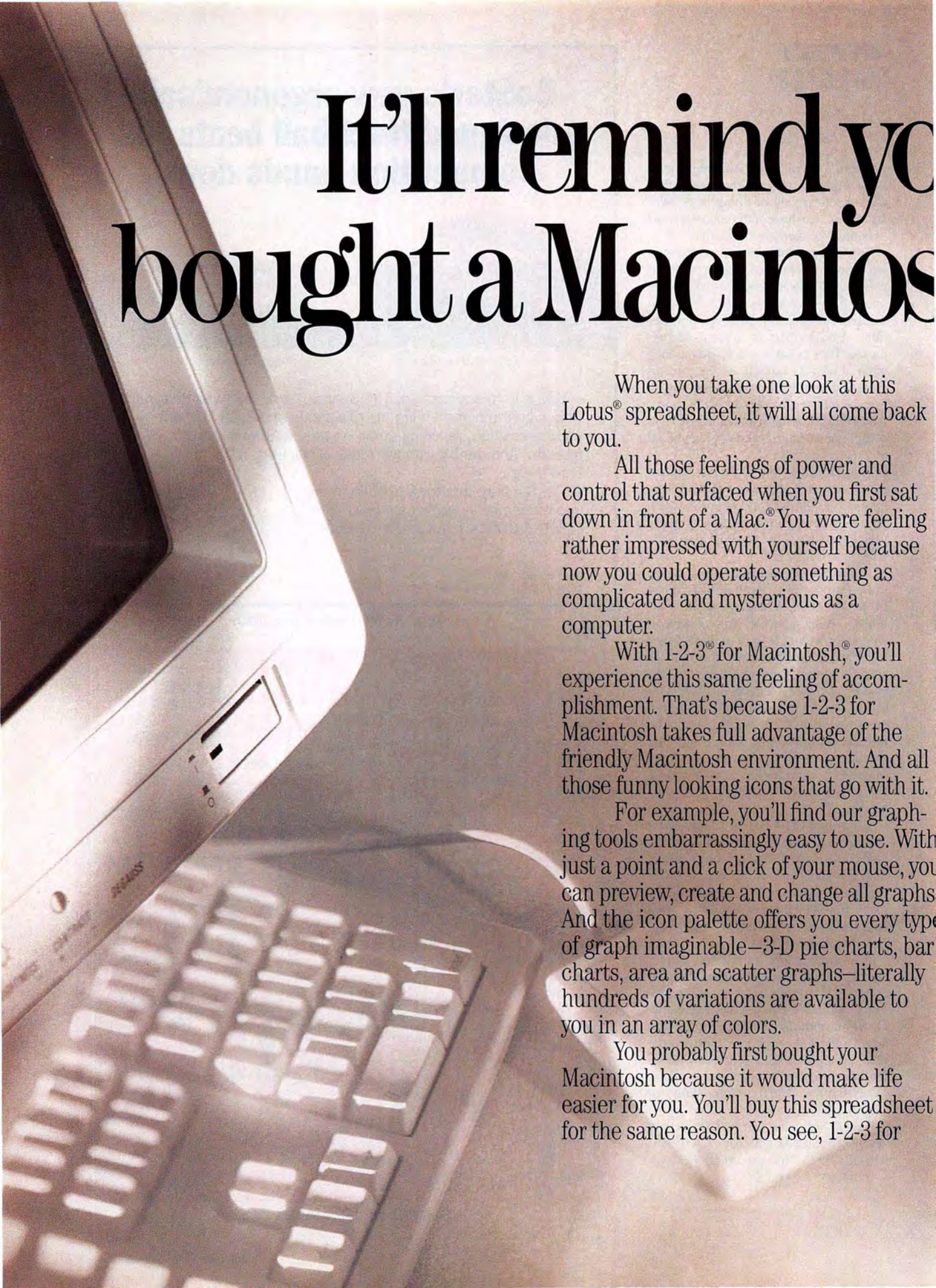
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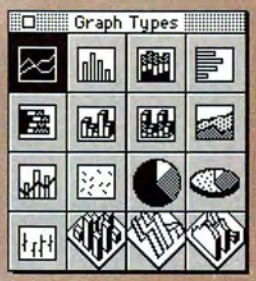
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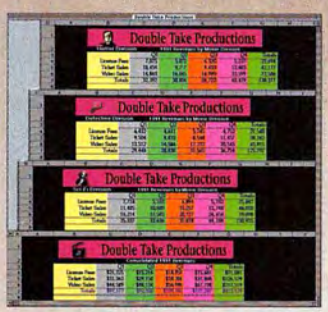
u of why you
h in the first place.



A tear-off palette full of 3-D pie, bar, area and scatter graphs will help you make the numbers look good, even when they're not so good.

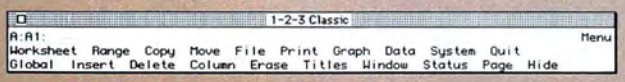
Macintosh is the only Mac spreadsheet to provide true 3-D technology so you can link files and consolidate data or create multi-page reports all in a single worksheet file. You can view and work with up to 256 worksheets simultaneously. In short, 3-D makes the job of analyzing and organizing your work fast and easy.

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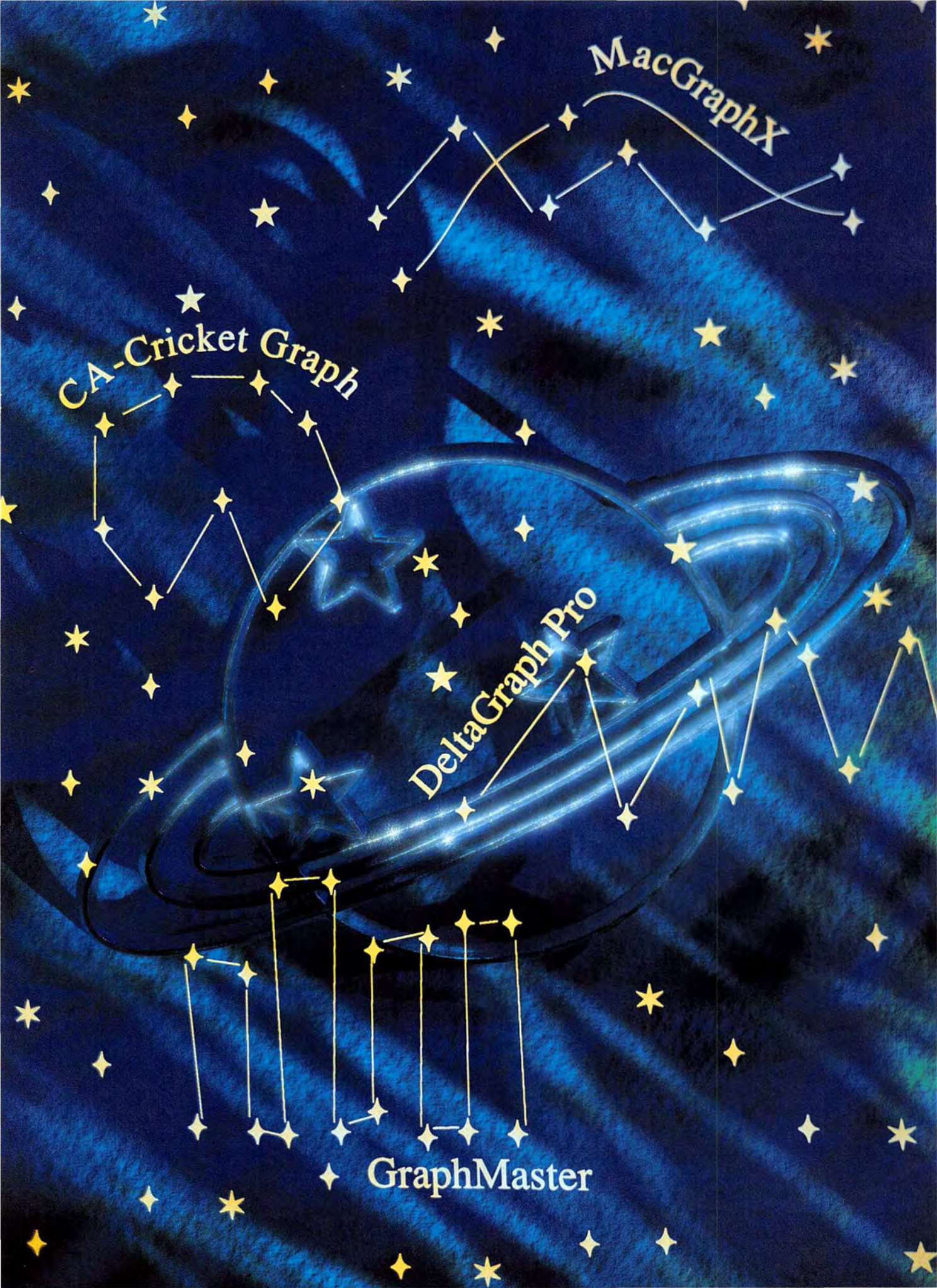

MacGraphX
CA-Cricket Graph
DeltaGraph Pro
GraphMaster

Chart Stars

A picture is worth a thousand numbers. DeltaGraph Professional and GraphMaster star among the current crop of charting packages.

BY RON HIPSCHMAN

If one out of every five Americans is functionally illiterate, you could probably quadruple that number for those who are numerically illiterate. Some people just don't understand numbers. Fortunately, most do understand pictures, which is why clear charts and graphs are so important.

Although a baffling array of packages is available to help you turn your numbers into graphs, we'll concentrate in this article on the four dedicated charting packages for the Mac: CA-Cricket Graph, from Computer Associates; DeltaGraph Professional, from DeltaPoint; GraphMaster, from Visual Business Systems; and MacGraphX, from Bravo Technologies.

PHOTOGRAPHY: PIERRE-YVES GOAVEC

Table 1: Pros and Cons of Charting Packages

	Pros	Cons	Ideal Users
CA-Cricket Graph 1.3.2	•Quality-control charts. •Good mathematical-manipulation capabilities. •Direct plotter output.	•No 3-D charts. •Cannot adjust bar/column spacing. •Very simple color capability. •No pictograms.	•Educators. •Scientists.
DeltaGraph Professional 2.0	•Best variety of charts and editing tools. •Good data import and graphics export. •Frequency analysis. •Presentation capabilities, including slide show.	•No combination graphs or data recoding. •No pictograms.	•Graphic artists. •Educators. •Business presenters. •Scientists and researchers.
GraphMaster 1.31	•Good editing and graph variety. •Pictograms. •Good data import and export. •Built-in programming language.	•No frequency analysis.	•Graphic artists. •Business presenters. •Scientists.
MacGraphX 1.0	•Good data labeling. •Chart editing. •Spreadsheet math. •Data import and export.	•No 3-D charts. •Only PICT and Clipboard export. •No pictograms.	•Educators. •Researchers.

Of course, these aren't the only packages that can produce graphs. All spreadsheet programs have at least rudimentary charting capabilities, and even illustration packages, such as Adobe Illustrator, have charting functions. But spreadsheet programs are primarily for working with numbers, not creating charts. Illustration packages are meant for creating graphics, not for numerical accuracy or flexibility. When you need maximum control over a chart, a dedicated charting package is the only way to go.

All graphing programs have a similar method of operation. You enter the data into a spreadsheetlike structure of cells. Of course, you don't want to have to type in all your data, although most programs let you do this, so you'll want to import the numbers.

All the packages let you import data in tab-delimited format. Other common formats include CSV (comma-separated values, a common mainframe format), SYLK (produced by most spreadsheet programs), Lotus 1-2-3's WKS and WK1, and Excel's BIFF.

Most packages reserve the first row and column for labeling each data series and the categories within the series. A data series is usually a group of data points taken at given times or places or according to any other logical criteria. The categories define the times, places, or situations when the data is actually taken. This article's example charts have three series of data, each series being a year's worth of attendance figures. The categories are the 12 months of the year, and each category value within each series contains the attendance for one month.

Once you have your data within a charting package, you may want to massage the numbers. This can take the form of performing mathematical operations, data sorting, data transposition, smoothing, curve fitting, data recoding, and frequency analysis.

Mathematical operations apply mathematical functions to one or more cells or perform tasks such as summing or averaging cells. Transposing data is a convenience feature that lets you switch rows for columns and vice versa. If your data is very noisy, smoothing sets the value of each point to the average of the points surrounding it. Curve fitting lets you fit a curve with a specific mathematical description (which you choose) to your data. The nature of the curve (linear, polynomial, log, exponential, and so forth) and the associated coefficients give you the relationship among the data points. Data recoding reassigns the values of cells based on their contents. An example might be, "Turn all the cells with the word *Monday* into *1*." Frequency analysis is what your teachers did when making up a bell curve.

Picturing Your Numbers

You've entered or imported your data and sorted and polished it to perfection, and now you want to see a picture. What awaits you is a mind-boggling array of chart

types from which to choose. The number of types is large, but it can be broken into a smaller number of basic forms.

The most common charts are area, bar, column, line, pie, and scatter. Each chart has appropriate uses, and it's important to pick the correct type to convey the information you want to get across. A chart of the wrong type may tell a completely different story from the one you intend.

Aside from the six types just mentioned, there is a good variety of specialized charts you may need every once in a while.

High-low-close charts, as their name implies, are used mainly for stock-market graphing, although they can often be used without the Close option when you need to display the range over which a set of values occurs within a category (daily temperature range during a month, for instance).

Polar charts, like *x,y* charts, plot two variables. In this instance, the data pairs represent *r* (the radius, or distance from the center of the chart) and θ (the angle *r* makes with some arbitrary 0-degree radius). This type of chart is used when the variables in your data have an angular dependence.

Contour charts take a 2-D array of numbers and substitute a pattern or color for each number, depending on its value. Just as a geographic map may assign different colors to differing altitudes, a contour chart lets you look at how your data changes according to its *position* in the array.

Combination charts let you see more than one chart at a time. You might want to overlay a column chart of sales figures with a line chart showing expected profits. Another type of combination chart, the double-*y*, lets you have two charts with independent and unique value (*y*) axes. One *y*-axis, with its labels, is displayed on the left side of the chart, and the other is displayed on the right side.

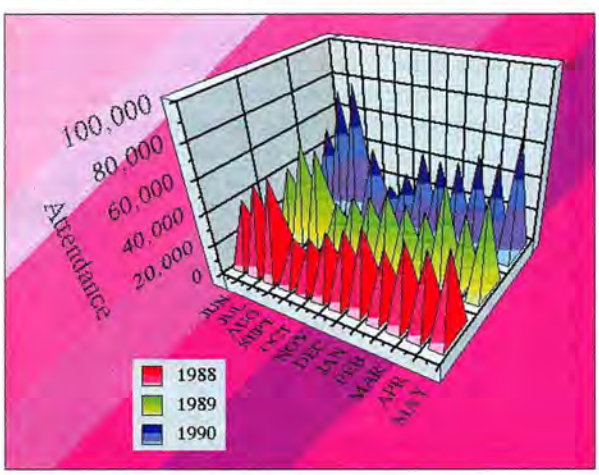


Figure 1: GraphMaster (shown here) and DeltaGraph Professional let you create spectacular 3-D charts. Unfortunately, 3-D charts often obscure more than they reveal. Can you figure out what values each pyramid represents? GraphMaster's pyramids are better than columns, because they don't block the back row as much.

Charts that add the third dimension have become all the rage recently. However, only in rare cases (usually wireframe and surface charts) can a 3-D chart display data more accurately than a normal flat chart can. Most of the time, the use of 3-D charts actually *obscures* information. Figure 1 shows an example. Take a regular grouped-column chart. Once it's three-dimensional, you have to decide which angle to view it from and then you add perspective to give it even more of that 3-D look. It may be beautiful, but just try to figure out what numbers the columns represent. Because of the chart's tilt and perspective, there's no way to compare the height of any column with the grid on the back wall — and this chart isn't tilted that much! Most 3-D charts are actually overblown 2-D charts, because the third dimension rarely contains any information. When pondering whether to use 3-D or not, ask yourself if you really have three dimensions' worth of data.

***Each** chart has appropriate uses, and it's important to pick the correct type. A chart of the wrong type may tell a completely different story from what you intend to convey.*

Touching It Up

There are two broad areas in chart editing: features that let you edit the information portion of the chart and features that let you edit for aesthetic appeal.

Informational editing includes editing axes, tick marks, grid lines, and exploding pies as well as adding error bars, data labels, and editable plot symbols.

All four packages let you edit axes, tick marks, and grids. You can place the axes arbitrarily within the chart, not necessarily only at the bottom and on the left, and you can determine the starting and ending values on an axis and how many divisions or major tick marks and grid lines to place between them. All the packages let you choose whether the value (*y*) axis has a linear or a logarithmic scale, and all let you choose the plot symbol used to identify the points of a series in line and scatter charts.

In the case of experimental data, error bars indicate possible deviation in the data. All the packages can generate these bars automatically, according to various statistical methods.

For aesthetics, all the packages let you decide the font and the style of chart labels, legends, and titles.

If you read *USA Today,* you're familiar with its famous picture charts, in which pictures, or pictograms, of appropriate items are stacked, stretched, or scaled. Only GraphMaster can create these.

If you want to add notations and other artwork to your chart, you'll need a set of basic drawing tools (lines, rectangles, round rectangles, ovals, and so on). All four of the packages give you the tools you need.

Sharing Your Vision

Here's where the ugly truth about color on the Mac smashes you in the face. There are few reasonably priced options for color output. The best way for anyone to view your charts is on the screen itself, but what formats can our charting packages produce? Most popular is the good-old PICT format. DeltaGraph Pro and GraphMaster can also save charts as Illustrator files.

Now let's take a closer look at each of the four packages in the areas of input and importing, data manipulation, chart editing, chart export, and number of chart types.

CA-Cricket Graph

The great-grandparent of them all, Computer Associates' CA-Cricket Graph, is still around, and it still looks pretty good (see Figure 2), considering its age. Although most people roll their eyes when you mention this package, it's still strong in many ways and is probably used by far more people than are all the others combined.

CA-Cricket Graph is fairly robust for importing data, lacking only the abilities to accept CSV files and to read Excel files directly. It is a bit weak in its data export, however, producing only tab-delimited text files. This problem is minor, though, because most spreadsheet and database programs can read tabbed text.

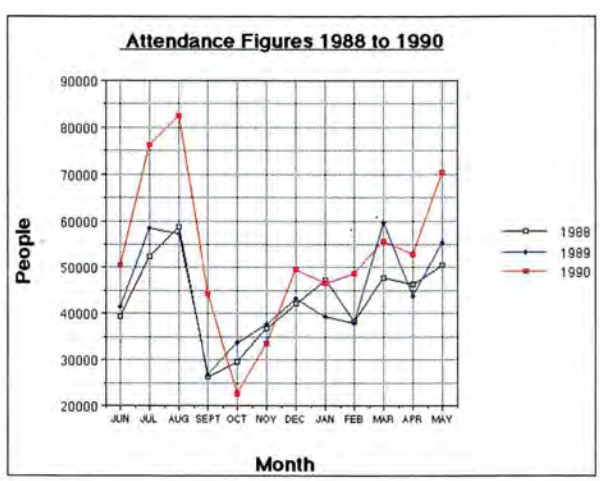


Figure 2: Often the simplest chart is the best. CA-Cricket Graph doesn't offer snazzy 3-D charts, but it holds its own when it comes to the basics of representing numbers visually.

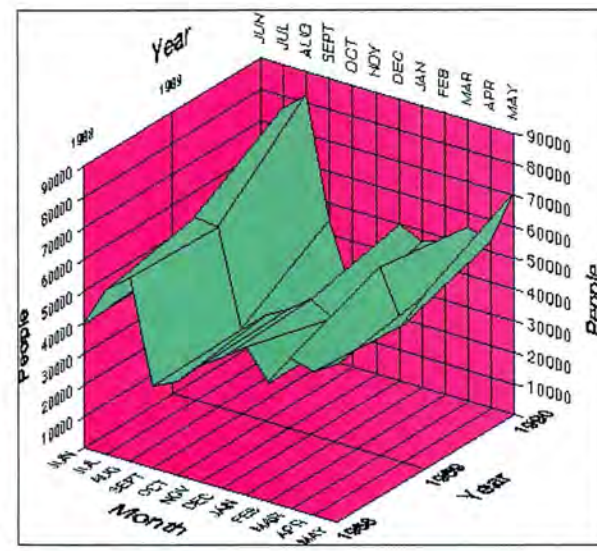


Figure 3: One valid use of a 3-D chart is to show how data changes with two variables (here, how attendance varied by month and year). DeltaGraph Professional's 3-D capabilities are excellent and include an option for projecting the contours of a 3-D chart on the floor or ceiling of the data cube.

CA-Cricket Graph is the best package of the four in the area of data manipulation. It sorts, recodes, transforms, smooths, curve-fits, does frequency counts, and performs simple math — just about anything you may need. The other packages should have followed CA-Cricket Graph's good example in this area.

Being the oldest program, CA-Cricket Graph can perhaps be excused for its lack of spiffy chart types and fancy editing tools, but when you really look closely, the only missing chart types are 3-D, multiple pies, and some kind of contour or surface charts. Because CA-Cricket Graph was originally designed for scientists and the display of scientific data and not for graphic artists doing layouts for board meetings, the package does not supply the now-familiar gradient fills, pictograms, or graphics fine-tuning. But still, Computer Associates should add the ability to vary bar/column spacing and overlap.

Once you've finished your charts, you can export them as PICT files or through the Clipboard. Although the package's exporting ability is a bit weak, CA-Cricket Graph is the only package that lets you output your charts directly to Hewlett-Packard pen plotters.

At about the time you read this, Computer Associates will be releasing version 2.0 of CA-Cricket Graph. The company says that the new version will have column formulas, dynamic updating, new statistical functions, faster charting, better chart editing (including unequal error bars), new curve-fitting options, and larger data sheets (1,000 columns by 32,000 rows). It wouldn't say whether version 2.0 will offer more chart types.

DeltaGraph Professional

DeltaPoint's DeltaGraph Professional 2.0 (see review, June '92, page 50) was worth the wait, being a major improvement over its predecessor, the venerable DeltaGraph 1.5. It imports many data formats, including tabbed text, CSV, SYLK, Excel 3.0, Lotus WKS, and even its competitor CA-Cricket Graph's files. It also lets you define specially delimited text. System 7's publish-and-subscribe is fully supported, as are Balloon Help, TrueType, and Apple events. You should have no trouble getting data or graphics into DeltaGraph Pro. (You can even import QuickTime movies!)

Its data-exporting ability, on the other hand, leaves much to be desired. DeltaGraph Pro can export data only as tabbed text. Even though most other packages can read this style of data, all your formatting is lost.

DeltaGraph Pro's data-manipulation capabilities fall slightly below those of its competitors, but not by much. It does, however, offer frequency analysis, which is a big plus if you want to "grade on a curve." The package's curve fitting is breathtaking.

For sheer number of chart types, DeltaGraph Pro will set your head spinning. All the basics are here, with a wealth of additional types, including 3-D, multiple scaled pies, *x,y* and *x,y,z* contour and surface, polar, double-*y*, ternary, spider, and bubble charts. The package can even produce organizational, bullet, table, and time-line charts.

DeltaGraph Pro has excellent chart-editing features but lacks the pictograms that GraphMaster can give you. In 3-D graphs (see Figure 3), DeltaGraph Pro (and GraphMaster) can label the three axes with letters and numbers that are tilted and rotated to align with the 3-D-ness of the chart axes — a nice touch. DeltaGraph Pro's drawing tools are the best of any in the four packages and include editable Bézier curves, polygons, and text with tabs, justification, a true ruler — the works! The color choices for objects are somewhat limited (88 shades), but you can design 16 custom colors, using the RGB, CMY, CMYK, or HSL color models. You can assign styled color gradients to objects and text.

Once you've finished with your chart, DeltaGraph Pro can export it through the Clipboard or in a variety of formats, including PICT, EPS, and Illustrator. The package has a built-in slide-show sorter and "projector," so you can create a presentation and then other users can play it back even if they don't have DeltaGraph Pro.

DeltaGraph Pro has the most extensive manual of the four packages, and it devotes a full chapter to detailing which chart types are best for which types of data.

GraphMaster

A relatively new entrant into the presentation-graphing market, GraphMaster comes to us fighting, with the gloves off. For a version 1.0 (well, actually 1.31), Visual Business Systems has obviously taken a good hard look at the competition and built a product that tries to beat them all (it succeeded, until DeltaGraph Pro was introduced).

GraphMaster imports data in all formats that DeltaGraph Pro imports (except that it can't read CA-Cricket Graph's native format), so entering data is a snap. It exports its data as tabbed text, CSV, or SYLK files, so this area is well covered too.

For *sheer number of chart types, DeltaGraph Pro will set your head spinning. The basics are here, with a wealth of additional types, plus great chart-editing features.*

The package has excellent data-manipulation capabilities. It's important to note here that although it may not have many built-in functions for data manipulation, it goes the extra distance and offers a powerful built-in programming language with REPEAT and IF structures.

GraphMaster runs a close second to DeltaGraph Pro in the number of chart types it offers and the finesse with which you can edit a chart's aesthetics. It's the only one of the group that offers pictograms.

Besides the normal blocks for its 3-D columns, GraphMaster lets you use flat plates, floating cubes, or pyramids to indicate column height. Only DeltaGraph Pro also offers column shapes. These shapes make it easier to peek around front columns to see other columns that would otherwise be hidden. GraphMaster also has lovely gradient fills. It exports charts via the Clipboard or as PICT or Illustrator files.

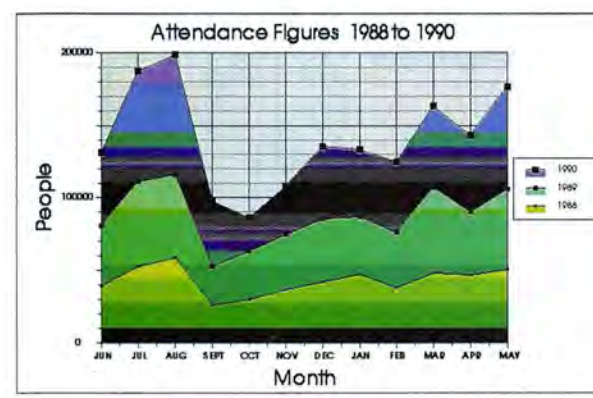


Figure 4: MacGraphX has the most-complicated — and versatile — data-import capabilities of the four packages, but its range of chart types doesn't match those of its competition. Still, it is a capable package, as this stacked-area chart demonstrates.

MacGraphX

Bravo Technologies' MacGraphX is a capable package that, alas, lacks some of the sophisticated features of its cousins. It does, however, have some abilities that make it a package you may want to consider.

MacGraphX has the most complicated, and hence the most versatile, import interface. It lets you import all or only a specified range of cells from a file. It also lets you offset and combine data from several spreadsheets into one of its worksheets; all the others simply let you import a complete file. The MacGraphX package includes a separate program that lets you read in data from files that contain fixed field lengths. This feature makes the package invaluable if you import data from mainframes. MacGraphX's data-exporting ability is adequate; you can export data in the tabbed-text, SYLK, and WKS formats.

Most people will be satisfied with MacGraphX's data-manipulation features and happy to find that the data-entry worksheet can contain formulas as well as numeric data. This makes for a much more powerful package, because you can plot not only raw data but also numbers derived from the raw data.

MacGraphX falls behind on the number of chart types it offers. It's completely missing 3-D charts as well as multiple pie, frequency-histogram, polar, contour, and surface charts. Hopefully, Bravo will beef up this area in future versions, but MacGraphX still contains the correct chart for 99 percent of most users' charting needs (see Figure 4). MacGraphX's chart editing gives you the tools to do just about anything you need. It can export your finished chart only through the Clipboard or as a PICT file, though.

The Bottom Line

If charting is one of your primary tasks, buy a dedicated charting package. Of the ones reviewed here, DeltaGraph Professional is the clear winner. It produces the widest variety of charts, has the best editing tools, and has adequate output flexibility. And with its presentation capabilities, it's an excellent choice, whether you're creating complex technical charts or organizational diagrams, text charts, or presentations. GraphMaster is also a good choice, especially if you need pictograms. CA-Cricket Graph and MacGraphX virtually tie. CA-Cricket Graph is slightly better for mathematical tasks and scientific charts, whereas MacGraphX has the slight edge for aesthetic editing.

People *need more than bulleted text, and nothing makes a point like a well-designed graph. Clear graphs are one of the best weapons to fight against innumeracy.*

Until recently, most of the attention in the presentation market has been on creating electronic versions of traditional flip-chart presentations. But people need more than just bulleted text these days, so numeric data to back up your points is just as important as those boring text slides. Nothing makes a point as clearly as a well-designed graph. Communicating the message of your numbers is often more important than the numbers themselves, and clear, effective charts and graphs are some of the best weapons we have in the fight against innumeracy.

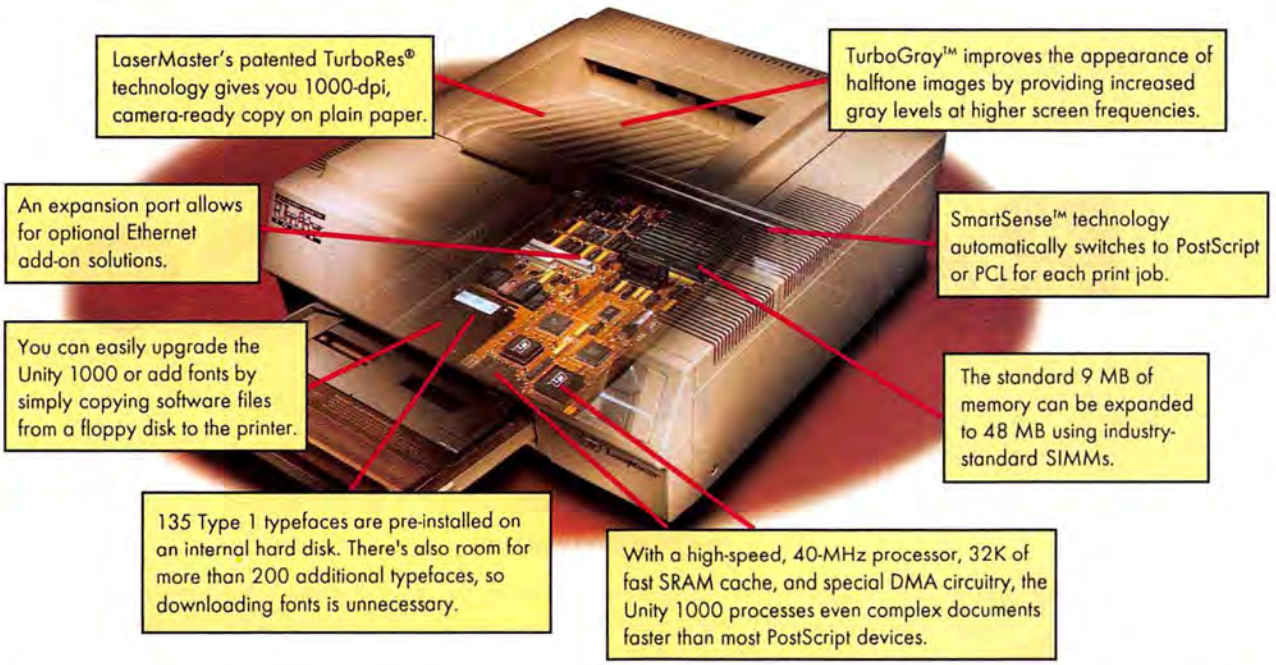
Ron Hipschman works at the Exploratorium, San Francisco's world-famous science museum, where he mothers Macs, writes, and teaches.

Table 2: Charting Packages

				
	CA-Cricket Graph 1.3.2	**DeltaGraph Professional 2.0**	**GraphMaster 1.31**	**MacGraphX 1.0**
	★★★½	★★★★★	★★★★½	★★★½
List price	$129	$295	$295	$199
Company	Computer Associates 1 Computer Associates Plaza Isandia, NY 11788 800-225-5224 516-342-5224	DeltaPoint, Inc. 2 Harris Ct., Ste. B-1 Monterey, CA 93940 800-367-4434 408-648-4000	Visual Business Systems, Inc. 380 Interstate N., Ste. 190 Atlanta, GA 30339 404-956-0325	Bravo Technologies P.O. Box 10078 Berkeley, CA 94709 510-841-8552

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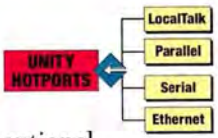


You'd make it fast. You'd have it print camera-ready copy on plain paper. You'd design it to store so many typefaces that you'd never waste time downloading another font. You'd make it easy to expand and upgrade, so it wouldn't become obsolete. And you'd make it capable of printing from just about any computer out there, just in case you ever need to print camera-ready copy from another computer. While you're at it, you'd probably throw in a hundred free typefaces.

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CIRCLE 178 ON READER SERVICE CARD.

THE Reference SHELF

Look it up! Your next set of reference books may not be books at all.

BY KEN GRUBERMAN

Some images are so powerful that they've forever burned themselves into our collective consciousness. There's John-John Kennedy saluting his father's casket, the Challenger explosion, and Diane Sawyer picking her jaw up out of her lap when Stephen Sondheim told her that he uses a rhyming dictionary and a thesaurus. Sawyer shouldn't have been shocked, of course. Writers write, and as Sondheim pointed out, there's no point in a writer's trying to come up with every word that starts with a *p* and ends in a *ch* when someone else has already taken the time to collect all that information into a few choice volumes.

Reference books are an essential part of every writer's arsenal, and in recent years, a new breed of reference book has emerged: the electronic edition. Unlike interactive aids such as spelling and grammar checkers, which are designed to improve your existing work, reference tools provide access to information you need *while* you work, such as "all the single-syllable words that start with a *p* and end with a *ch*."

Few electronic reference products are as complete and thorough as their paper counterparts, however. On the other hand, a computer-based book doesn't take up any shelf space. And there's one other thing electronic books have going for them: a brain. Almost all electronic reference programs support wildcard searches, which means that you don't even have to know how to spell what you're looking for in order to find it.

Encyclopedias

The clear winner here is Grolier's New Electronic Encyclopedia: 1991 Edition. With 33,000 articles and more than 10,000,000 words, this CD-ROM is a cogent source of up-to-the-minute information. How up-to-the-minute? The latest version has articles on fetal alcohol syndrome, optical computing, and Planet X, to name a few.

The encyclopedia's information is current, certainly, but not necessarily complete. The *Academic American Encyclopedia,* on which the CD-ROM is based, is a midsized encyclopedia, so the average article is only a few paragraphs long at best. Major subjects have the expected amount of verbiage, but the rest of the entries are trivialized down to just a paragraph or two.

What the encyclopedia may lack in comprehensiveness is more than made up for in innovation. The 1991 edition includes more than 200 high-quality, full-color maps; more color paintings, drawings, and photographs than ever before; and sound, a unique and valuable addition. For example, you can look up the life of Martin Luther

PHOTOGRAPHY: STEVE UNDERWOOD

Beacon
HyperBible
Webster's Ninth New Collegiate Dictionary
Familiar Quotations
John Bartlett
THE NEW THESAURUS
ROGET'S II
Macintosh IIci

King, Jr., see a full-color picture of him, and then hear an excerpt from his famous "I have a dream" speech. The disc's other sounds are mostly associated with famous historical figures and events, birds and mammals, composers and compositions, and musical instruments.

Unfortunately, because of budget and time constraints, a sampling synthesizer was used to mimic most of the included instruments (see Figure 1). The Mac's 11K playback rate makes these instruments sound phony and unconvincing. That shortcoming aside, the rest of the sounds are first-rate, as is the software that accompanies the encyclopedia. The search routines are sophisticated yet easy for anyone — adult or child — to use.

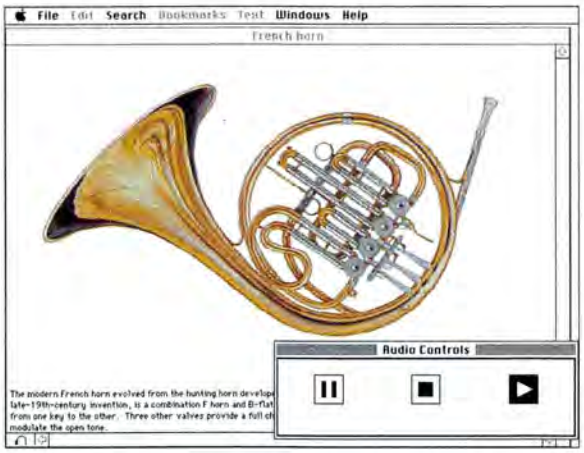


Figure 1: Grolier's New Electronic Encyclopedia: 1991 Edition is a CD-ROM that easily beats its competition, Microlytics' Random House Encyclopedia DA. Grolier includes sound with some of its entries, but the musical examples, such as the sound of this French horn, are synthesized, not real. The result somewhat undermines the disc's value as a complete reference work.

Microlytics has issued an electronic edition of *The Random House Encyclopedia* as a DA, but the only thing this DA has in common with the much superior book version is the name. The encyclopedia is another in Microlytics' InfoDesk series and follows the company's previous effort at a reference work, a reverse dictionary called Inside Information. Like that product, the Random House Encyclopedia DA is really a glorified dictionary of terms, people, places, and things. At only 5 megabytes' worth of information, it can't be much else.

As Microlytics sees it, a key selling point is that users don't need a CD-ROM player. True enough. If your information needs are satisfied by one-to-two-sentence descriptions, the Random House Encyclopedia may be your cup of tea. The longest entry is only a paragraph. This product is more of a "thought provoker" than an encyclopedia, so it's not much of a reference tool.

The Random House Encyclopedia DA includes a Reverse Dictionary function, but it doesn't work too well. With this function, you can find things in the encyclopedia by describing them, but you must describe them in exactly the same way the program does. For example, *Egyptian paper* gets you *papyrus* and a lot of other things vaguely associated with papyrus, but *primitive paper* gets you nothing.

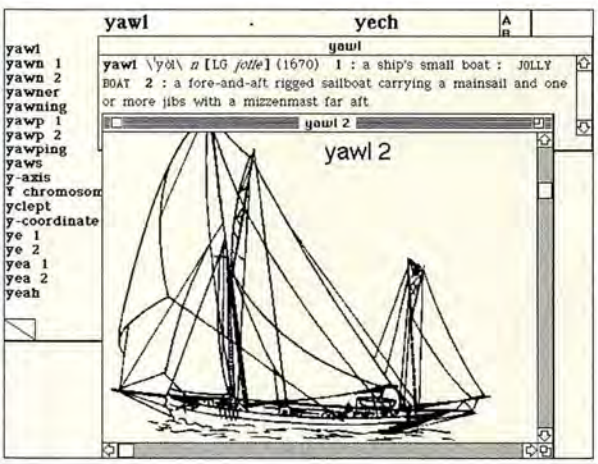
There are notable inconsistencies in the DA's information as well. For example, Leisure and Entertainment includes a listing for *Oprah Winfrey* and *Humphrey Bogart* but not for the terms *movie, film,* or *cinema.* There is, however, a listing for *canasta.* If you currently own *The Random House Encyclopedia* in book form, keep it and use it. You're not missing anything here.

Dictionaries

There are several electronic dictionaries to choose from: Webster's Ninth New Collegiate Dictionary, from Highlighted Data; Funk & Wagnalls Standard Desk Dictionary and The Concise Dictionary of 26 Languages, from Inductel; and The American Heritage Electronic Dictionary, from WordStar International. In contrast to the encyclopedias, the dictionaries' strengths and weaknesses are not so evident at first glance.

Among the dictionaries, as with the encyclopedias, the CD-ROM product — Webster's Ninth New Collegiate Dictionary, in this case — is the winner. This time the reason isn't just the CD-ROM's capacity but also that the electronic version is a perfect replica of its source. The disc contains exactly the same material as the paper version of the dictionary and has room left over for unique extras.

You can toggle the font size from regular to large. The search engine is first-rate, and the word heading at the top of each "page" changes to reflect the word you're searching for. The user interface is easy to grasp, and pictures and illustrations appear in their own pop-up windows (see Figure 2). With a single command, you can copy and paste



a word, complete with its definition.

The most noteworthy new feature of this electronic edition is sound: This is the first dictionary that talks. A professional announcer pronounces every one of the 160,000 root words, and you can turn this feature on and off. Don't get too excited, however; the idea is better than the execution. All the words were recorded at the lowest sampling rate possible, and they sound like it.

Inductel's Funk & Wagnalls Standard Desk Dictionary doesn't have the style or completeness of the Webster's CD-ROM, and its Mac interface is downright abysmal, but it does have optional, specialized dictionaries that deal with biology, chemistry, computer terms, electronics, mechanical engineering, and physics. Its definitions are more cursory than Webster's or the American Heritage Dictionary's, and etymologies, histories, and usage suggestions, when they are present, are shorter as well.

The only innovation in the Funk & Wagnalls dictionary is the adjunct volume, The Concise Dictionary of 26 Languages. You can type a word in English and see translations of it in 26 other languages. (Wouldn't pronunciation be nice here?) You can also type a word in any of the 26 languages and see how it is spelled in English. All the languages are represented on the same screen at the same time, inviting comparisons. Unfortunately, the word list for this section of the dictionary is very limited and sometimes inaccurate. For example, there is no listing for *hello* in any language, and *goodbye* is spelled *goodby*.

Of the three, the least desirable is The American Heritage Electronic Dictionary. It comes with a thesaurus, but neither the dictionary nor the thesaurus are as good as ones you can buy separately. On the positive side, this dictionary's thesaurus button is active when you're using the dictionary, so it's easy to shuttle between the two. If you want, you can have both screens open at once — the dictionary on the top and the thesaurus on the bottom, so you can browse both files at the same time. But because neither file is especially extensive, this may not be much of an advantage.

The American Heritage Dictionary also has a gimmick: anagrams. Scrabble players will love this function, but unfortunately, the feature is severely limited. The program can form variants only on words of up to five letters — six if you put an *s* after certain words. Even then, it can't find obvious word combinations. There's undoubtedly a word list instead of an algorithm at the heart of the anagram function and that's a shame. Like The Random House Encyclopedia DA's Reverse Dictionary function, this anagram function is an idea that deserves better than it gets.

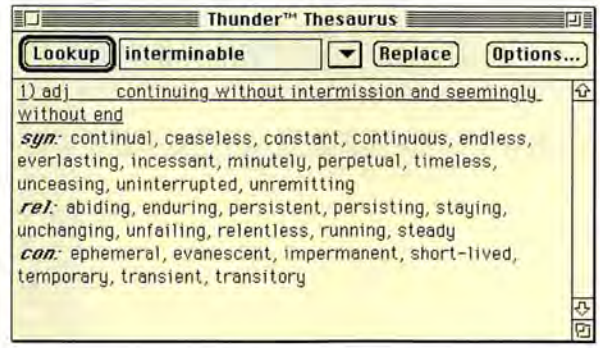


Figure 3: Thunder 7 is by far the most powerful and flexible thesaurus you can buy. It includes 1.4 million synonyms, antonyms, and contrasting and related words plus custom and user dictionaries, user glossaries, and interactive spell checking. Its thesaurus window shows not only a word's definition but also meaning groups by part of speech and even grammatical variants on definitions.

Figure 2: Webster's Ninth New Collegiate Dictionary, from Highlighted Data, is one of the best dictionaries yet for the Mac. It contains the entire contents of the 1,400-page Webster's paperback and more on a single CD-ROM. Holding down the Command key and double-clicking on any word in a definition takes you to that word. If there's an illustration connected with the word, it will automatically appear in its own window.

Thesauri

The choice of best thesaurus depends on whether you're running System 6 or System 7. For the former, it's Deneba's BigThesaurus; for the latter, it's Thunder 7, from Baseline Publishing.

Baseline Publishing's Thunder 7 (see Figure 3) is by far the most powerful and flexible thesaurus. It also takes up the most hard-disk space. Thunder 7 can insert itself automatically into any menu you define and can also correct spelling after the fact or interactively spell-check as you type. The thesaurus has 1.4 million synonyms, antonyms, and contrasting and related words and also comes with user dictionaries and several custom dictionaries for names, contractions, and computer terms.

Hard on Thunder 7's heels is Deneba's BigThesaurus. It also sports 1.4 million synonyms plus definitions. Also like Thunder 7, it has user-definable font and size preferences and makes good use of color; unlike Thunder 7, it lists at the top of the window the number of meaning groups and sets them apart by using different symbols.

The major drawback for BigThesaurus fans is that it doesn't run under System 7, and Deneba wouldn't say when, or even if, a System 7-compatible version would be released.

Another thesaurus is the new Word Finder Plus, from Microlytics. Taking up a scant 290K of disk space and 70K of RAM, it returns four times as many words as its predecessor. After those benefits, however, the celebrating stops. Word Finder Plus has no color implementation, no user-definable font and size settings, and no definitions. It also appears as a menu item in the Finder — for no discernible reason, considering that Word Finder Plus

can't be used in the Finder, only inside applications. Another problem is that in our testing, it interfered with normal operations of several Now Utilities 3.0.2 modules and even tied up a Word 5.0 document by keeping it from saving normally. More work needs to be done for it to be on the level of Thunder 7 and BigThesaurus.

Report Ideas, from ia Software, and its sibling program Letter Ideas are thesauri of phrases, not of words. There is nothing like them in the book world. Report Ideas is designed for one specific task, writing reports, and Letter Ideas is for writing letters. These DAs give writers a boost by helping alleviate writer's block, in that, unlike words, phrases are waiting to be completed as sentences. These DAs are simple to use and extremely efficient: Each contains more than 100,000 phrase combinations and takes up only 33K of disk space! Any phrase combination is automatically copied to the Clipboard for easy pasting.

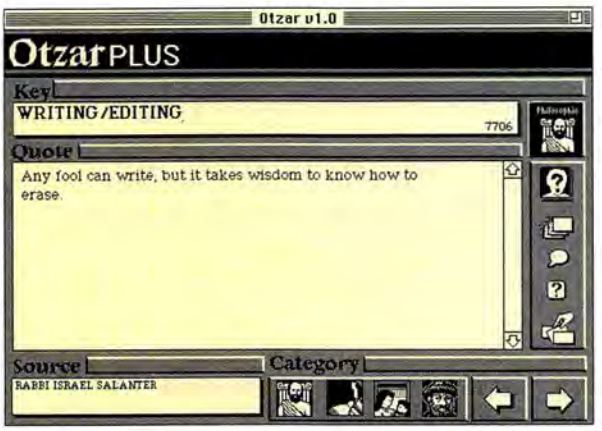


Figure 4: More than 2,000 years of Jewish wit and wisdom is available at the touch of a button in Davka's wonderful Otzar Plus. It includes sage advice, quotes, anecdotes, wisdom, and simply great stories on just about any topic you can think of. Otzar Plus is invaluable for anyone on the banquet circuit.

Style Guides

Strunk and White must be turning in their graves over what Microlytics has done to their landmark publication, *The Elements of Style*. The book has long been revered for its charm, wit, and sheer readability — something rare for a reference book — but all that has been stripped away in The Elements of Style — Electronic Edition, a single-disk DA version. The presentation of information lacks coherency, and the InfoDesk DA interface is as execrable and primitive as it is in the other Microlytics products. Like The Random House Encyclopedia, all this program has in common with the hard-copy version is the name. Read the book, and forget this trashy attempt at literary credibility.

Although it's easy to dislike Microlytics' products, it's harder to figure out which of the other style guides for the Mac — Editorial Advisor, from Petroglyph, or Correct Writing, from WordStar International — is the better. Editorial Advisor is the more extensive of the two (six HyperCard stacks) and is also more difficult to use. This is primarily because of icon overkill and small on-screen text size. On the other hand, Editorial Advisor has capabilities not found in other style guides, such as a guide to copyediting as well as proofreading marks. The program is most effective when you open it in conjunction with a word processor, but if your Mac has limited memory, this may not be possible.

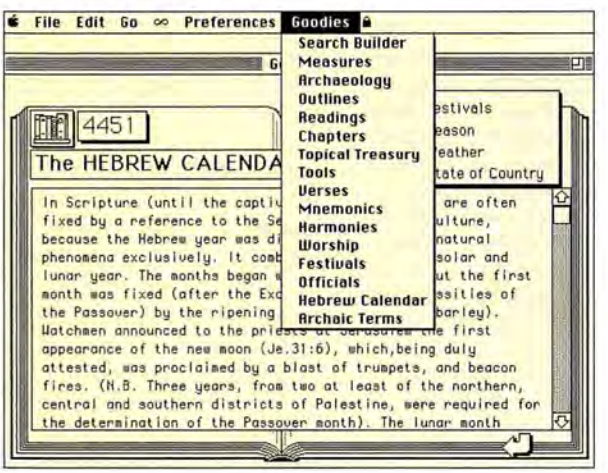
WordStar International offers a solution to this problem. It supplies two identical versions of Correct Writing in the same box. (All three of the "Correct" products — Correct Writing, Correct Letters, and Correct Quotes — offer this convenience.) One version is a traditional HyperCard 2 stack that can be run as an application. The other is a HyperCard 1 stack that can be opened from a DA called Writing Guide.

Correct Writing isn't quite as sweeping as Editorial Advisor, but it's easier to use and easier to read. The stack design is simple and elegant. The search routines are also better than the competition's. There are no facilities for making custom entries, but in using a style guide, most people just want to find constructive advice on how to write better; this product gives it to them.

Quotations

No one has created a Mac version of *Bartlett's Familiar Quotations* yet, so in the interim, we have two products to choose from: Correct Quotes, from WordStar International, and 2001 Quotes, from Heizer Software.

Of the two, Correct Quotes is greatly superior. At first glance, the reason would seem obvious: Correct Quotes contains more than 5,000 quotes. Content notwithstanding, Correct Quotes is also better because it looks better. Once again, WordStar's HyperCard-stack design is elegant, straightforward, and pleasing.



Philosophy and Literature

A well-stocked reference shelf should contain a Bible and any other favorite books concerning religious viewpoints or philosophical pursuits, if for no other reason than to tap the incredible number of ideas such books contain. HyperBible and Gems of the Word, from Beacon Technology; Otzar Plus, from Davka; and The Complete Works of Shakespeare, from CMC Research, are all first-rate and highly recommended.

Of the group, Otzar Plus was the biggest unknown and the biggest surprise — it's a lot of fun! A nicely designed stack, it showcases more than 2,000 years of Jewish sayings, stories, proverbs, and concepts (see Figure 4). You can choose from categories such as The Talmud, Philosophy, Folk Stories, or Hassidic, and you can click on a Biography button to find out more about the source of the item in question. This is a true original.

HyperBible is an immense program, filling more than 9 megabytes of disk space. If you've ever wanted to study the Bible in a friendly, relaxed way or are involved with the Bible on a daily basis, this is a must-have item (see Figure 5). If, however, you'd just like to use the Bible as a source for quotations or for words of wisdom, Beacon's DA companion product, Gems of the Word, is more appropriate, because it's more compact and accessible.

For those who need some quick inspiration for both mind and spirit, Gems of the Word may be just the ticket. A small and simple DA, it contains more than 2,000 of the most useful, best-loved, and most often quoted passages from the Bible. Not only is this a convenient way to get ideas for speeches and other writing tasks but the program also comes with an application that puts a random quote on the screen at startup.

Figure 5: Beacon Technologies' HyperBible contains an enormous amount of supporting and explanatory material, all designed to make the Biblical world real and alive to contemporary users. If you're looking for a particular quote or phrase but don't know where it's located, Search Builder, on the Goodies menu, will find it for you.

CMC's Shakespeare disc is fascinating. For one thing, it contains both the queen's-English and modern-English versions of Shakespeare's plays. The disc also includes the Bard's poems and sonnets.

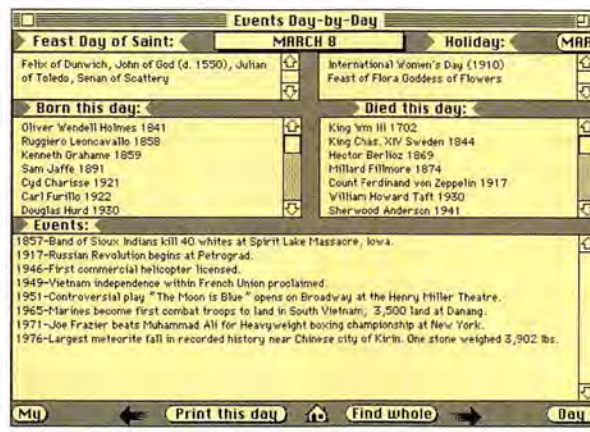


Figure 6: Not everything in the reference world has to be serious. You can find out what world-shattering events happened on your birthday in Events Day-by-Day, part of Heizer Software's excellent Writer's Dream Tools. This set of five stacks is a must for trivia buffs and a great tool to have around when you're stuck and just can't think of what to write next.

You might think that searching through that many words on a CD-ROM just to find a juicy quote or two would be an excruciatingly slow process, and you would normally be right. However, DiscPassage, CMC's CD-ROM software, lets you search a CD-ROM in just seconds.

CMC also makes other CD-ROM discs that use the DiscPassage software, including the Multimedia Audubon's Birds and The Complete Works of Sherlock Holmes. Although the CMC discs are wickedly fast in operation, they lack sophistication: Each disc contains raw, unformatted text in Geneva font.

Tools and Tidbits

Writers get stuck. That's an inevitable part of writing. But often all it takes to get unstuck is a phrase or interesting tidbit of information. Author Larry Belling has combined five stacks aimed at writers into one convenient package, Writer's Dream Tools (distributed by Heizer Software). The stacks are Events Day-by-Day, The Stack of Lists, The Stack of Decades, Clichés and Catch Phrases, and the Slang Thesaurus.

The events stack contains information keyed to the days of the year: who was born, who died, and what major ancient and modern world events happened on that particular day (see Figure 6). You can search by event, person, or date. The interface is a little crude, but the program is easy to use and always makes you sound more interesting than you are.

The lists stack is a mind-boggling 1.1 megabytes' worth of lists: people, places, and things around the world. Clichés and Catch Phrases can be extremely useful to anyone involved in writing for film, TV, news, and advertising. The Slang Thesaurus is handy for those who like a colorful phrase — if you've ever needed to know Australian slang terms for toilet, this is the stack for you. The Slang Thesaurus also includes newer terms such as *surfer, skate-boarding,* and *gang-speak.*

Sometimes you can get stuck even if you're just writing a business letter. For those times, there's Correct Letters, from WordStar International, a collection of 273 typical business letters in text format and a HyperCard stack with which to search them.

All you have to do is find the category of letter you need

and narrow the selection, and Correct Letters produces a complete letter, waiting to be personalized. You can either work within the stack, and even print from it, or export the letter to your word processor. Correct Letters also includes The Letter Guide, which can help you understand the guiding principles behind good letter writing. The guide is as easy to use and understand as the rest of the product.

The Bottom Line

If you're thinking about trashing all your well-thumbed reference volumes in favor of their electronic equivalents, don't do it. Most of the electronic packages still have a long way to go to equal their paper progenitors, but there are enough successes that you can build a reasonable electronic reference shelf. For electronic versions of the basics — dictionary, thesaurus, and encyclopedia — the choices are easy: Webster's Ninth, Thunder 7, and The New Electronic Encyclopedia: 1991 Edition. For philosophy and religion, there's HyperBible and Otzar Plus. For literature, there's The Complete Works of Shakespeare. For style guidance and quotations, there are the three "Correct" packages from WordStar (Letters, Writing, and Quotes) and Writer's Dream Tools. Stephen Sondheim won't be tossing his rhyming dictionary and thesaurus any time soon, but someday, that may just happen — and then Diane Sawyer will really have a story.

Ken Gruberman was the editor of Los Angeles' MacValley user-group newsletter for three years. During that time, he learned the true value of reference works and now cannot live without them.

Writer's Reference Tools

Baseline Publishing, Inc.
5100 Poplar, Suite 527
Memphis, TN 38137
901-682-9676
Thunder 7 1.0.6, $99.95

Beacon Technology, Inc.
631 Elkton Drive
Colorado Springs, CO 80907
719-594-4884
Gems of the Word 1.0, $39.95
HyperBible 2.0, $199

CMC Research
514 N.W. 11th Street
Suite 203
Portland, OR 97209
800-262-7668
503-241-4351
The Complete Works of Shakespeare, $29.95
The Complete Works of Sherlock Holmes, $29.95
Multimedia Audubon's Birds, $49.95

Davka Corp.
7074 N. Western Avenue
Chicago, IL 60645
312-465-4070
Otzar Plus 1.0, $39.95

Deneba Software
3305 N.W. 74th Avenue
Miami, FL 33122
305-594-6965
BigThesaurus 1.0c, $99.95

Grolier Electronic Publishing, Inc.
Sherman Turnpike
Danbury, CT 06816
800-356-5590
203-797-3530
The New Electronic Encyclopedia: 1991 Edition 2.0, $395

Heizer Software
P.O. Box 232019
Pleasant Hill, CA 94523
510-943-7667
2001 Quotes, $25
Writer's Dream Tools 1.0, $149

Highlighted Data, Inc.
4350 N. Fairfax Drive
Suite 450
Arlington, VA 22203
703-516-9211
Webster's Ninth New Collegiate Dictionary 1.05, $199.95

ia Software
6070 Business & Technology Center
Macomb, IL 61455
800-676-9304
309-833-5959
Letter Ideas, $125
Report Ideas, $125

Inductel, Inc.
5339 Prospect Road
Suite 321
San Jose, CA 95129
800-367-4497
408-866-8016
The Concise Dictionary of 26 Languages, $49.95
Funk & Wagnalls Standard Desk Dictionary, $49.95
McGraw-Hill Scientific and Technical Terms, 3rd Edition, $149.95

Microlytics, Inc.
2 Tobey Village Office Park
Pittsford, NY 14534
716-248-9150
The Elements of Style — Electronic Edition 1.01, $59.95
The Random House Encyclopedia — Electronic Edition 1.03, $119.95
Word Finder Plus 4.02, $69.95

Petroglyph, Inc.
118 King Street
Suite 545
San Francisco, CA 94107
415-979-0588
Editorial Advisor 1.0.5 7, $149.95

WordStar International, Inc.
201 Alameda del Prado
Novato, CA 94949
415-382-8000
The American Heritage Electronic Dictionary, $99
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CIRCLE 164 ON READER SERVICE CARD.

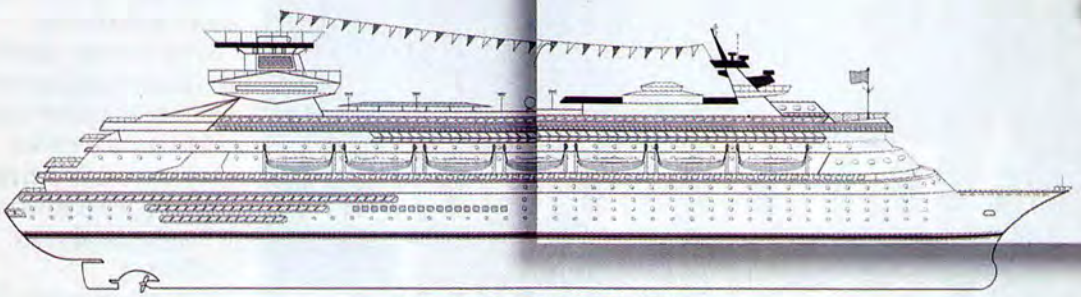
22107H

Table 1: Features of Recommended Writer's Tools

	The Complete Works of Shakespeare	Correct Letters 1.0	Correct Quotes 1.0	Correct Writing 1.0	HyperBible 2.0
	★★★★½	★★★★	★★★★	★★★★½	★★★★
List price	$29.95	$49.95	$49.95	$59.95	$199
Pros	Fast search engine. Queen's-English and modern-English versions of the plays. Includes poems and sonnets.	Good source of model business letters. Final writing can be done inside program or with designated word processor. Good interface design.	Can quickly search for quotes on topic or author level. Users can add favorite quotes. Good interface design.	Provides useful information on writing form, usage, and style. Can be used as a DA. Good interface design. Comprehensive index.	Makes Bible study easier with hyperlinks and searchable text. Has audible pronunciation of more than 400 Bible names. Several different ways to find desired material.
Cons	Unformatted text in Geneva font.	Needs more categories for letter searching.	Not comprehensive enough; needs more quotes and topics.	Needs more subjects and cross-references.	Cluttered and inelegant interface.
Company	CMC Research 514 N.W. 11th St. Ste. 203 Portland, OR 97209 800-262-7668 503-241-4351	WordStar International, Inc. 201 Alameda del Prado Novato, CA 94949 415-382-8000	WordStar International, Inc. 201 Alameda del Prado Novato, CA 94949 415-382-8000	WordStar International, Inc. 201 Alameda del Prado Novato, CA 94949 415-382-8000	Beacon Technology 631 Elkton Dr. Colorado Springs, CO 80907 719-594-4884

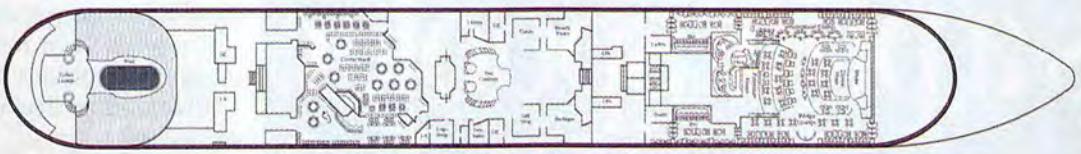
	The New Electronic Encyclopedia: 1991 Edition 2.0	Otzar Plus 1.0	Thunder 7 1.0.6	Webster's Ninth New Collegiate Dictionary 1.05	Writer's Dream Tools 1.0
	★★★★★	★★★★★	★★★★½	★★★★½	★★★★
List price	$395	$39.95	$99.95	$199.95	$149
Pros	Lots of sound. Lots of color pictures and maps. Easy-to-use search engine.	Large database of Jewish wit and wisdom is fun and informative. Well-designed HyperCard interface.	Automatically installs itself into any program. Interactive spell checking. Custom and user dictionaries. Good use of color.	Complete version of standard dictionary. Type can be any size. Easy-to-use search engine. Pronounces words.	Convenient one-stop source for facts, information, and arcana. Allows wildcard searches.
Cons	Pictures and maps cannot be exported or printed. Many articles are short and perfunctory.	Needs more topics and better explanation of icons.	Complicated installation and setup. Takes up more disk space than other thesauri.	Low audio fidelity makes understanding pronunciations difficult.	Events Day-by-Day and The Stack of Decades need more material. Poorly implemented interface.
Company	Grolier Electronic Publishing, Inc. Sherman Turnpike Danbury, CT 06816 800-356-5590 203-797-3530	Davka Corp. 7074 N. Western Ave. Chicago, IL 60645 312-465-4070	Baseline Publishing, Inc. 5100 Poplar, Ste. 527 Memphis, TN 38137 901-682-9676	Highlighted Data, Inc. 4350 N. Fairfax Dr. Ste. 450 Arlington, VA 22203 703-516-9211	Heizer Software P.O. Box 232019 Pleasant Hill, CA 94523 510-943-7667

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- **Background printing.** Returns control of your Macintosh to you faster.
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BUYER'S GUIDE

MacUser

Choosing the Right Storage

Your 100-megabyte hard drive doesn't seem so spacious — or speedy — anymore. But before you buy more room, turn the page and read why more isn't necessarily more anymore — and where to best target your storage dollar.

Then dig in to the rest of this month's Buyer's Guide: Learn about revolutionary new 3.5-inch 128-megabyte magneto-optical cartridge drives; read about the latest developments in 5.25-inch optical technology; find out how to stuff an extremely fast 3.5-inch gigadrive mechanism into your IIcx, IIci, or Quadra 700; discover a high-speed bypass to your Mac's notoriously slow SCSI port. And when you're up-to-date on current storage technology, consult our comprehensive directory in this Storage Buyer's Guide to find out who's selling what and where to find it.





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And expanded modes that let you enlarge images and get a closer look at your work.

C&C
Computers and Communications

*15", 17" and 21" CRTs yield 13.8", 15.6" and 19.7" active display areas.

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system that will make you open wide and say ahhh.

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MW EDITORS' CHOICE 15" MultiSync 3FGx Monitor MacWorld Magazine, March 1992

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NEC

Storage:

What to Buy, What to Pay

Where are you going to fit all that new software? What about those giant color and QuickTime files? Backups? Archives? It may be time for a change.

BY RIK MYSLEWSKI



You've run out of room on your hard disk. What's the solution? A bigger hard drive? This is a common answer but often the wrong one. Before you write a hefty check for multiple megabytes, switch on your Mac; click through your folders; and divide your files and applications into those you use constantly, those you access occasionally, and those you seldom open but can't bear to trash.

Congratulations. You've just defined the three major categories of mass storage. Which applications and files do you need to have available at all times? They belong on your *primary-storage* drive. What files can you keep easily accessible, grouped by project and ready to swap with other users or deliver to service bureaus? Put them on *removable cartridges*. Finally, don't forget to regularly save copies of all your important files onto a *backup device*. You can also reclaim precious space on your primary-storage disk by using your backup device to archive files that are no longer active but that are crucial for reference and record keeping.

Primary-Storage Drives

Hard drives are traditionally the first choice for primary storage — if the six years since the introduction of the Mac Plus can establish a tradition. Although removable-cartridge drives can be used for primary storage, they can't match a hard drive's speed, safety, economy, and reliability.

Hard drives come in a wide range of capacities but only three form factors: those based on *2.5-inch* mechanisms, which are currently limited to 20 to 120 megabytes and which are used in PowerBooks and tiny transportable drives from such companies as La Cie, Liberty, and Mass Microsystems; those based on *3.5-inch* mechanisms, which have capacities as large as 1 gigabyte (see "3.5-Inch Gigabyte Hard-Disk Mechanisms," in this Buyer's Guide); and those based on *5.25-inch* mechanisms, the champion of big, fast primary-storage devices. We recommend that you look at fast, compact 3.5-inch models first and move on to hefty 5.25-inch or miniature 2.5-inch models when size, speed, or capacity dictates.

ILLUSTRATION: TIM CARROLL



Remember that you're not limited to hard drives that are located inside your Mac or parked on your desktop. If you need to transport data between Macs and you don't know if a cartridge drive awaits you at your destination, a *transportable* hard drive is your best bet. Transportable drives contain some of the same mechanisms as their desktop brethren do, but they're smaller, lighter, and more rugged. Although most transportable drives plug in to the wall, expect to see transportable PowerBook partners — the 1.3-pound Liberty 20 Series is a pint-sized pioneer — that run on battery power.

If total security is your goal, consider a *removable* hard-drive subsystem. This option lets you unplug the hard-drive mechanism from the power supply and carry it with you or lock it away. If demanding graphics applications such as Photoshop are too slow even on the fastest gigadrives, consider going into debt to invest in an external *solid-state* drive or equip your Mac with enough 16-megabyte SIMMs to create a sizable RAM disk.

For More Information . . .

MacUser closely follows the growing storage market and keeps you up-to-date on the best primary-storage, removable-cartridge, and backup and archiving devices. The following *MacUser* articles, culled from the best of our recent coverage, include lab reports with comprehensive testing and information about upcoming products and technology as well as reviews with timely looks at the hottest new products.

Primary-storage drives

"Sizable Storage: 200-Megabyte Hard Drives," April '92, page 108 — Forty-one 200-megabyte hard drives are analyzed for performance and quality. Also included are an explanation of how a drive stores, finds, and moves data as well as a discussion of caching.

"Searching for Storage Perfection: 100-Megabyte Hard Drives," November '91, page 124 — Thirty-two 100-megabyte hard drives are put through a test suite. Service and warranty statistics are also detailed.

"Gigadrives: The 1,000-Megabyte Solution," July '91, page 140 — Nineteen 1,000-megabyte gigadrives are rated for speed, service, and support. Also included are tips on gigadrive care and disk partitioning.

"Life Begins at 40 Megabytes: Small Hard Drives," April '91, Buyer's Guide page 4 — We report on thirty-two 40-megabyte hard drives and include tips on connecting SCSI devices, an illustration of the ideal external drive, and information on other storage options.

"Surviving the Crash: Hard-Disk Recovery," April '91, Buyer's Guide page 42 — This analysis of four hard-disk-recovery programs also includes tips on fixing a crash without recovery software and advice on how to prevent hard-drive problems.

Removable-cartridge drives

"Magnetic-Cartridge Drives: The Next Generation," January '92, page 126 — We rate twenty-three 88- and 90-megabyte magnetic-cartridge drives that contain a SyQuest mechanism or Iomega's Bernoulli mechanism. Also included are solutions to cartridge-mounting problems and an illustration of how SyQuest and Bernoulli mechanisms work.

"SyQuest Doubles Up," June '91, page 54 — We take a first look at the SyQuest SQ5110 88-megabyte mechanism.

"Portable Secure Unlimited-Storage Cartridge Drives," February '91, page 206 — We compare 30 magnetic-disk-cartridge drives based on the SyQuest, Ricoh, and Bernoulli mechanisms and include an introduction to other types of removable-media drives.

Backup devices

"Double-Duty Drives: Multifunction Optical Storage," November '91, page 108 — We analyze three multifunction mechanisms that combine both WORM and erasable optical technologies.

"Less Is More: Digital Audiotape," October '91, page 116 — Nineteen DAT drives are tested, and helical-scan recording is illustrated. Also included is information on data compression.

"Pinnacle Micro REO-6500 and PLI Jukebox Junior," August '91, page 56 —Two high-capacity optical jukeboxes are reviewed. Also included are test results and a discussion of optical-jukebox technology.

"Overnight Success: Network Backup," August '91, page 112 — Five network-backup-software/DAT-drive combos are tested.

"Maximum Movable Megabytes: Erasable Optical Drives," November '90, page 102 — Twenty erasable optical drives are rated. Also included are a cost comparison of three removable-media technologies and information on WORM technology.

"Getting It on Tape," December '89, page 189 — We test 30 tape drives. Also included are a discussion of tape-backup-drive construction and a cost comparison of 12 types of storage media.

— Nancy Peterson

Either way, you'll have the fastest storage that money can buy — although an external solid-state drive will still be hindered by the slowness of the Mac's built-in SCSI port (see "Supercharging the SCSI Bus: SCSI-2 Cards," in this Buyer's Guide) and using an internal RAM disk means data loss in the event of a system crash or power failure.

If speed and reliability are all-important, consider a fault-tolerant *disk array* — available from Loviél, Core, and others — which can distribute the storage work load and data-loss risk over multiple drives, resulting in impressive performance and crashproof security. Be forewarned of the risk when using a non-fault-tolerant disk array such as MicroNet Raven, however. Despite the Raven's remarkable performance, data is extraordinarily difficult to restore after a crash — if your Raven takes a nosedive, call a data-recovery service such as DriveSavers, of Novato, California (415-883-4232), and let a professional painstakingly reassemble the data.



Removable-Cartridge Drives

Although few users will ever need a disk array, most already own a cartridge drive, the *floppy-disk* drive that comes with their Mac. These drives are slow and the disks are small and fragile, but floppies are still the best way to swap small files among nonnetworked Macs.

If your files are too big for a floppy disk, consider a *Floptical* drive, which has a mechanism from Insite Peripherals. This hybrid technology combines optical head positioning with magnetic recording to pack as much as 25 megabytes on what looks like a standard floppy disk, although it costs significantly more. Floptical-drive vendors such as PLI and Procom claim that their drives can read standard floppy-disk formats, but MacUser Labs technicians report some compatibility problems with early units — check them out before you buy.

The real battle in cartridge-drive

Figure 1: Lowest-Cost Mass Storage

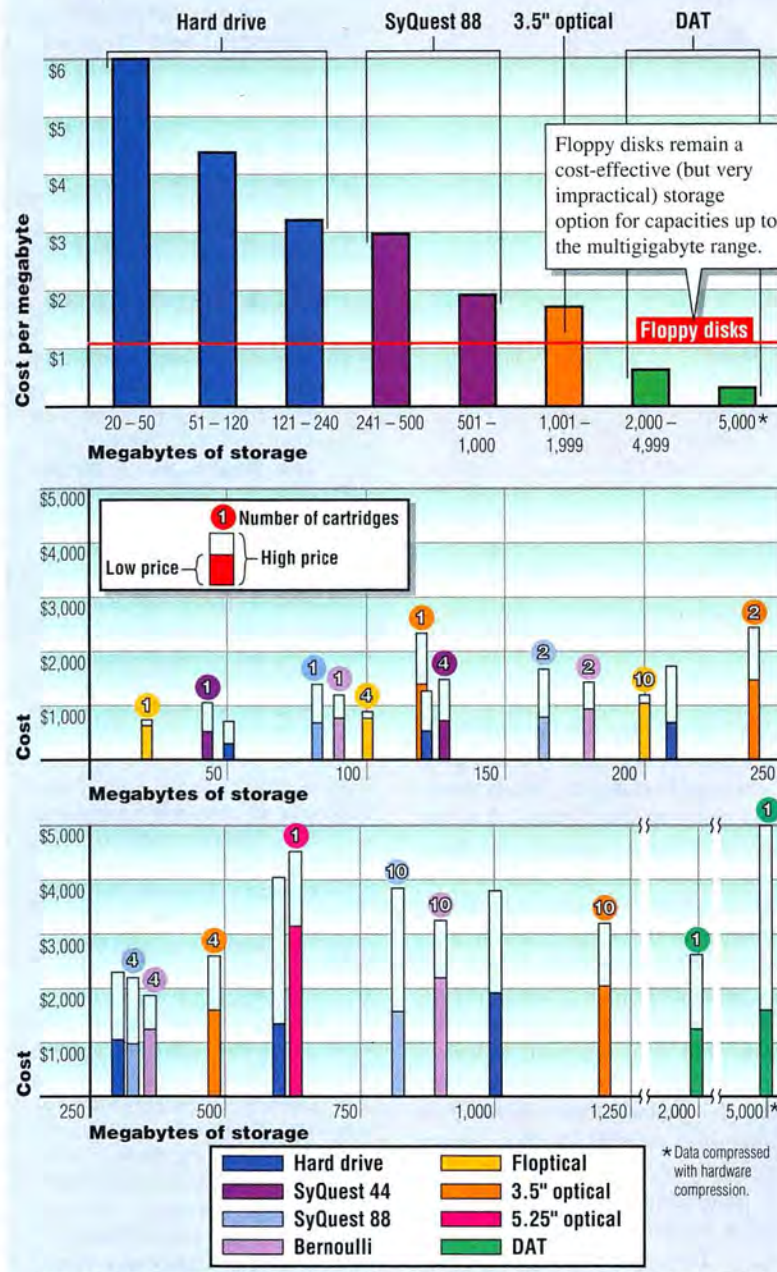
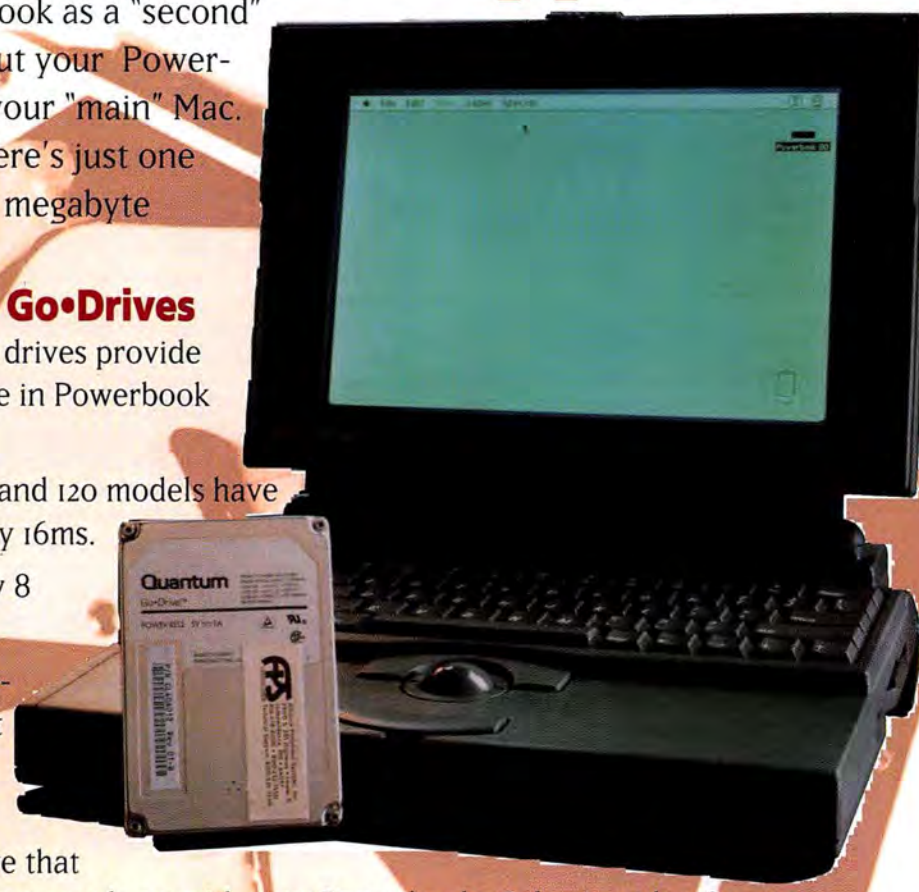


Figure 1: Hard drives, 88-megabyte SyQuest, 3.5-inch optical, and DAT drives are the low-price leaders in the capacity ranges indicated in the top chart. The cost-per-megabyte prices shown are the lowest available prices and (except for floppies) include the cost of the drive and the cost of the number of cartridges needed to achieve the capacity indicated. As you progress from floppies to DATs, the main cost component shifts from media to drive: With floppies, the drive is built in to most Macs and all you pay for is the media; at the other extreme, DAT offers a near-zero media cost per megabyte and the only significant cost is the drive. The other two charts show the total cost of drives and media at a variety of capacities, indicating the range from the lowest to the highest prices we found for each storage solution.

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technology is between 5.25-inch magnetic-cartridge drives with a *SyQuest* or *Bernoulli* (Iomega) mechanism and the new *3.5-inch optical drives*. Read "Pocket Opticals: 3.5-Inch Magneto-Optical Drives," in this Buyer's Guide, for the lowdown on this duel of the removables.



Backup Devices

Even though SyQuest, Bernoulli, and 3.5-inch optical cartridge drives can also be used for backup and archiving, you'll need more room than they offer to store many large files — and much more room if you're planning to back up an entire network.



These low-capacity cartridge drives have one great advantage over most other backup devices: Like hard drives, they are random-access devices that let you quickly locate any file. Only one popular high-capacity backup device shares this ability — and, not surprisingly, it's also a cartridge drive: a *5.25-inch optical cartridge drive.* Single-cartridge drives are limited to 650 megabytes or 1 gigabyte, but multiple-cartridge jukeboxes are available from IDE, Pinnacle Micro, and PLI. In addition to performing backup duties, a jukebox can provide an astounding amount of information at all times.

Most backup devices use magnetic tape rather than random-access magnetic or optical media. The oldest Mac tape technologies — *DC2000-* and *DC6000-cartridge drives* and *Teac-cartridge drives* — move tape past a stationary head, which generally causes slow performance and low capacities. Newer *helical-scan* tape drives pass the tape over a rotating cylindrical read/write head, a technology that provides greater data density.

Helical-scan technology is a network administrator's dream: One 4-millimeter DAT (digital audiotape) cartridge, which is smaller than a short stack of business cards, can hold 2 gigabytes, or with in-drive compression, 5 gigabytes. An 8-millimeter Exabyte cartridge can hold as much as 8 gigabytes with compression.

Don't discount streaming-tape drives, however. An inexpensive Teac-cartridge drive, which uses a cartridge similar to a standard audiotape cassette, is a good backup device for a single Mac. New high-density DC2000- and DC6000-cartridge drives can provide rugged, reliable backup of as many as 525 megabytes. (DC6000-cartridge drives that hold more than 1 gigabyte exist for other platforms — expect them for the Mac soon.) In fact, because a streaming-tape drive can start and stop the tape almost instantly, it has a performance advantage, when connected to a slow Mac such as an LC II, over a helical-scan drive, which needs time for its cylindrical head to come up to speed.

Bigger is not always better. Sometimes the best solution is not the most expensive one. When choosing your next storage device, carefully assess your everyday computing — primary-storage requirements, removable-cartridge opportunities, backup and archiving necessities — and then target multiple solutions for specific needs. You'll work faster and smarter, save money, and sleep better.

Rik Myslewski is a *MacUser* senior editor and director of MacUser Labs. Darryl Chan, assistant editor, also contributed to this report.

Dealer or Direct?

If you've seen ads for low-priced Mac hardware available directly from the manufacturer and assumed there has to be a catch to phone shopping, your caution could prove costly.

As in any business, mail-order — also known as *direct* sales — is not immune from scam artists, misleading claims, bollixed transactions, and outright fraud. It's easy to safeguard yourself against the unscrupulous few, however, and reap the benefits of cost savings offered by the majority of reputable direct sellers.

Before you buy anything, ask a few questions: Can you return the product if you don't like it, and is there a restocking fee? Who pays for return shipping if the product is damaged in transit? What kind of warranties apply? Be sure to pay by credit card, so in the event of a dispute, your credit-card company can do the fighting for you (and suspend the disputed charges in the interim). Ask for opinions at your user group, or post a notice on an on-line service such as ZiffNet/Mac to see what kind of experiences other customers have had with a particular source.

Direct marketers generally offer support, advice, and troubleshooting as good as or better than most retail dealers'. And most direct sources have better inventory systems than retail dealers do — they can often get a high-demand product into your hands faster than your dealer can.

Don't dismiss dealers and VARs (value-added resellers), however — they still have an important place in the market. They can provide customized CPU configurations; complete network planning; and on-site services such as installation, training, and maintenance.

— Jon Zilber

Download a Consultant

For the right answers to your storage questions, sometimes it's best to consult a consultant. But because good advice can be expensive, we've developed a HyperCard-based expert system: Which Storage Device Should I Buy? asks a few basic questions about your storage needs and then tells you which system is right for you. It's available exclusively on ZiffNet/Mac, *MacUser*'s on-line service. The filename is WCHDRV.CPT, and you can find it in Library 3 (Utilities) of the MacUser Forum (GO ZMC:MACUSER).

Table 1: Pros and Cons of Storage Systems

	Pros	Cons	Ideal Users
Primary-storage drives			
2.5-inch hard drives	•Compact. •Low power consumption. •Fit inside PowerBooks. •Quiet.	•High cost per megabyte. •Maximum capacity of 120 megabytes.	•Storage-hungry PowerBook users. •Travelers who need tiny transportables.
3.5-inch hard drives	•Fit inside IIcx, IIci, and Quadra 700. •Very fast new models.	•New high-capacity models not yet proven.	•Users who need reliable, fast storage, especially in internal drives.
5.25-inch hard drives	•Reliable, proven technology. •Wide range of capacities and prices.	•High power consumption. •Some older models can be slow.	•Low capacities: bargain hunters. •High capacities: power users.
Transportable hard drives	•Fit inside a briefcase. Lightweight. •Convenient.	•Some models are expensive. •Must be rugged to survive.	•Travelers who carry data to sites that have no cartridge drive.
Removable hard drives	•Best hard-disk security. •Faster than removable-cartridge drives.	•Some models are expensive. •Can't be mounted without a reboot.	•Users who demand the utmost in data safety and lockup security.
Disk arrays	•Very fast. •Advanced versions are fault-tolerant.	•Expensive. •Basic versions don't allow file recovery after a crash.	•Users who require speed and security and are willing to pay for it.
Solid-state drives	•Extremely fast. •No mechanical parts to wear out.	•Very expensive. •Performance limited by Mac's SCSI bus.	•Only users with the most time-sensitive tasks can justify the cost.
Removable-cartridge drives			
Floppy drives	•All Macs since late SEs have 1.4-megabyte floppy drives.	•Very slow. •Low capacity. •Disks susceptible to dust and magnets.	•Every user needs — and most already have — a high-density floppy drive.
Floptical drives	•Higher-capacity disks than floppy disks. •Also read floppies.	•Mediocre performance. •Disks susceptible to dust and magnets.	•Users who need to move single large files among Macs.
SyQuest cartridge drives	•Large installed base. •Service-bureau standard. •Many vendors.	•88-megabyte drives can't write to 44-megabyte media. •Cartridges susceptible to shock.	•Users who need compatibility with a large installed base.
Bernoulli cartridge drives	•Exceptionally well built. •Rugged cartridges and drives.	•90-megabyte drives can't write to 44-megabyte media. •Limited choice of vendors.	•Users who need rugged reliability and DOS compatibility.
3.5-inch optical cartridge drives	•Low cost per megabyte. •Compact, reliable, inexpensive cartridges.	•Mediocre speed. •Drives are more expensive than SyQuest or Bernoulli.	•Users who need compact, reliable data transfer or archival storage.
Backup devices			
5.25-inch optical cartridge drives	•650-megabyte or 1-gigabyte cartridges. •Some drives offer WORM option.	•Mediocre speed. •Some drives may not read media from other vendors.	•Users who can afford high-capacity, reliable random-access backup.
DC2000- and DC6000-cartridge drives	•Time-tested technology. •New DC6000-cartridge drives are very fast for tape.	•Only the most recent drives have a low per-megabyte cost.	•Network managers who need reliable, low-capacity backup more than speed.
Teac-cartridge drives	•Inexpensive drives and media. •Fast.	•Low capacities have mediocre speed. •Limited capacity.	•Users who want to back up economically although often slowly.
Helical-scan (DAT and Exabyte) drives	•Very fast. •Compact, inexpensive media. •Maximum capacity of 5 gigabytes on DAT cartridge (compressed). •Maximum capacity of 8 gigabytes.	•Slow to start and stop. •Repeated searches shorten media life.	•Network managers who need to back up an entire network quickly.

Pocket Opticals:

3.5-Inch Magneto-Optical Drives

MacUser Labs looks at ten 3.5-inch optical drives, which promise safe, pocket-sized passage for millions of bytes of data.

BY MARK FROST, JOHN RIZZO, AND THE MACUSER LABS STAFF

It looks like little more than a fat floppy, but it holds 88 times as much data. It holds 50 percent more than a SyQuest or Bernoulli cartridge, but it slips into a shirt pocket for safe passage to a local service bureau. A 128-megabyte magneto-optical cartridge, with its accompanying 3.5-inch magneto-optical drive, is the latest in storage technology. It's also one of the safest and longest-lasting forms of storage: 3.5-inch optical cartridges are so impervious to magnetic fields that you won't lose data even if you stick one to your refrigerator with a magnet.

PHOTOGRAPHY: WALT DENSON


3½"
Rewritable
magneto-
optical disk

MacUSER LABS 3.5-Inch Magneto-Optical Drives

There are plenty of methods to choose from when it comes to archiving and transporting Mac data. Whether it's been tape, SyQuest, Bernoulli, Floptical, or 5.25-inch optical drives, various devices for long-term storage or transportation of data have evolved over the past few years. But compared with other products, the new 3.5-inch optical drives offer the greatest reliability in the most portable of packages to date.

For example, drives that use optical technology to locate data and magnetic technology to read and write it are slow. The disks these drives use are plagued by the same shortcomings as floppies are — low capacity and questionable data integrity (see the "Removable-Media Alternatives" sidebar). Although SyQuest and Bernoulli drives are faster — and are something of a removable-media standard for the Mac — 3.5-inch optical drives use cartridges that offer greater data integrity and cost less: The price of a 128-megabyte 3.5-inch optical cartridge is not even half that of a SyQuest 88-megabyte cartridge. And a SyQuest cartridge, which is something like a hard-disk drive in a plastic case, is also larger and heavier and needs to be handled gingerly (see Table 1).

Magneto-optical drives also promise greater compatibility with each other than is the case with SyQuest or Bernoulli drives. High-capacity SyQuest or Bernoulli drives cannot write onto low-capacity SyQuest or Bernoulli cartridges — nor are SyQuest and Bernoulli drives compatible with each other. But thanks to a recently adopted ISO (International Standards Organization) standard, all 3.5-inch optical drives should be compatible with each other, although the standard allows for some mechanism differences that may create compatibility problems. For example, the IBM MD3125A mechanism spins its discs at 1,800 rpm whereas the Sony SMO-P301 mechanism spins its discs at 3,000 rpm, so a cartridge designed for use in a fast-spinning drive may not be able to work in a slower drive, and vice versa. If you plan to use a removable-media drive for exchanging data, compatibility is crucial — check our compatibility table (see Table A in the "Not All Discs Are Equal" sidebar).

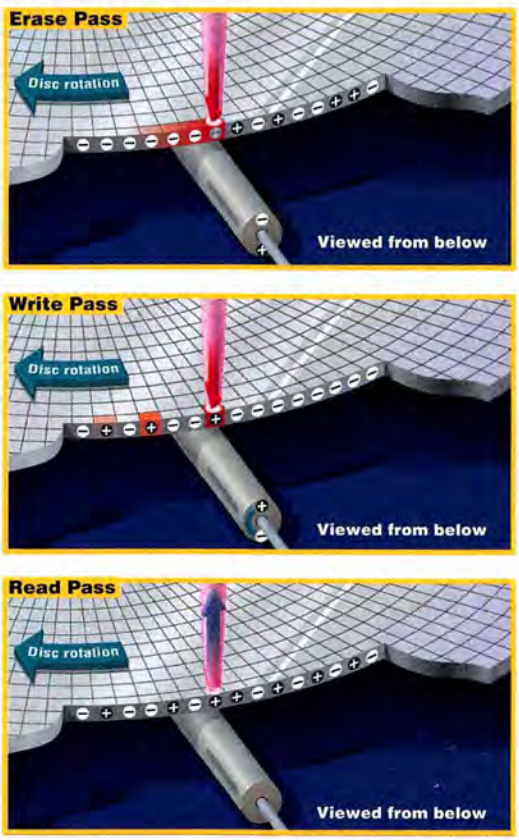
Nonetheless, 3.5-inch optical drives use the most fail-safe method for storing data, the same technology as that in 5.25-inch magneto-optical drives (see the "How It Works: Magneto-Optical Drives" sidebar), which promises to house your data safely, well into the next century.

How It Works: Magneto-Optical Drives

Erase Pass: Before a drive can write to a magneto-optical disc, it must first erase the portion of the disc it will be writing to. A laser heats a spot on the disc to a temperature of around 150 degrees C, the Curie point. At this temperature, the spot's magnetic polarity can be changed by an electromagnet. In the erase pass, the electromagnet is switched on and applies a polarity (shown as minuses) to the area on the disc to be written to, effectively creating all 0s.

Write Pass: Once the portion of the disc to be written to has been erased, the laser returns to write the 1s. Quick pulses of the laser again heat the medium to its Curie point, where it can adopt the opposite magnetic polarity (shown as pluses), supplied by the electromagnet, whose polarity has been reversed.

Read Pass: To read data, the drive uses what is known as the Kerr effect, in which polarized light is rotated when it is reflected from a magnetized metal surface. During the read pass, the laser runs at a lower power and bounces light off the medium. The optics in the laser assembly then read the differences in polarization as 1s and 0s.





For this report, MacUser Labs looked at ten drives based on three 3.5-inch optical mechanisms. These were the only drives available at test time, and each was available for less than $2,000. But by the time you read this, more than a dozen 3.5-inch mechanisms — from such companies as Epson, Fujitsu, Olympus, Panasonic, and Ricoh — should be integrated into the products of more than three dozen U.S. vendors alone. And all these drives should be able to read from and write to media from other drives (see the "On the Horizon" sidebar).

We looked at five drives based on the Sony SMO-P301 mechanism: the Mass Microsystems DataPak MO/128, Optima Technology DisKovery 128MO, Pinnacle Micro REO 130S, PLI Infinity Optical 3.5" Drive, and Procom Technology MEOD 128. We also tested four drives based on the MOST RMD-5100-S mechanism: The DGR Technologies 128REM, Liberty Systems 115 128MB-MO, MacProducts Magic 128REM, and OCEAN Microsystems Vista 128. And finally, we tested the Microtech OR120, which is based on the IBM MD3125A mechanism.

We examined each drive's documentation, software, and construction and then subjected the drives to our suite of performance tests based on four real-world applications — tests that not only let you know how each drive would perform in these specific applications but also examined specific aspects of drive operation such as access speed, sustained throughput, and caching efficiency. We sorted a 2,000-record 4th Dimension database to evaluate the access speed of each drive and copied a 13-megabyte file with CE Software's DiskTop utility to examine sustained throughput. We then duplicated a 13-megabyte file with the Finder to test the efficiency of each drive's cache and examined all aspects of drive operation by opening, rotating, and saving a 5.4-megabyte Photoshop image.



Earth-Friendly Packaging

Before you can even think about turning on your new drive, you've got to know if you have everything you need. We began our inspection by taking a good look at the packaging to make sure that it provided adequate protection without being wasteful (see Figure 1). All the drive vendors packed their drives in either foam or plastic popcorn, neither of which is easy to recycle. Furthermore, none of the boxes we examined had the recycling logo. None of the vendors reported that the ink on their boxes was soy-based (it's easier to recycle paper that contains soy-based ink rather than traditional oil-based ink). Vendors ought to try harder to reduce the amount of waste in their packaging and to incorporate recycled or recyclable materials. Apple, Hewlett-Packard, and IBM's OEM Products are leading the way in this respect; it's time for the smaller vendors to follow suit.

Once you've got the box open, a packing slip telling you exactly what's in the box should be right on top. However, of the boxes we examined, only those from Mass Microsystems, Optima, Pinnacle Micro, and PLI contained such slips.

Most hard drives come preformatted, so you might never have to deal with the formatting software that was shipped with the drive. All you need to concern yourself with is setting the SCSI-ID number on the drive and terminating the drive. Setting up removable-media drives is similar, but you'll probably be using more than one cartridge and the cartridges usually come unformatted. Not only do you need a good understanding of how your drive's formatting software works but you also have to install a

system extension that will help mount your cartridges on the desktop after they've been formatted.

Because removable-media drives can be complex to use, we took a close look at all the documentation and software that accompanies these drives. We were pleased to see that many of the vendors felt the same way as we do about providing detailed instructions and powerful yet easy-to-use software. Leading the list for the best documentation were Mass Microsystems, PLI, and Procom Technology, whose manuals are written specifically for the drives they accompany and include clear instructions and illustrations that cover all aspects of hardware installation. Optima Technology provides an excellent manual that covers all aspects of setting up an optical drive — too bad it was written for a 5.25-inch optical drive. Although many of the instructions are the same as they are for a 3.5-inch drive, $1,500 ought to buy you a manual for your specific drive. The other vendors, with the exception of Liberty, offer adequate installation instructions. Liberty provides only a photocopy of the instructions for the MOST OEM mechanism, which were written by MOST for vendors, not users.

Table 1: Battle of the Drives

	3.5-inch magneto-optical drives	88-megabyte SyQuest drives
Drive cost	$1,300 – $2,000	less than $800
Media cost (per megabyte)	40 – 50 cents	$1.30 – $1.40
Storage capacity per cartridge	120 megabytes, formatted	85 megabytes, formatted
Compatible with	a dozen cartridge brands	a single cartridge brand
Speed rating (scale of 1 – 10)	6	10
Transportability of media	floppy-sized, sturdy	big, bulky, fragile
Data reliability	Cartridges impervious to magnetic fields. Drive heads distant from medium.	Cartridges susceptible to magnetic fields and damage from dropping. Drive heads close to medium.
Media life	30+ years	5+ years
Ejection method	auto	manual

Table 1: As storage devices, 3.5-inch optical drives beat 88-megabyte SyQuest drives in every area except speed and drive cost. Optical cartridges are significantly less expensive, are more portable, and provide greater data security.

Figure 1: Price Versus Service and Packaging

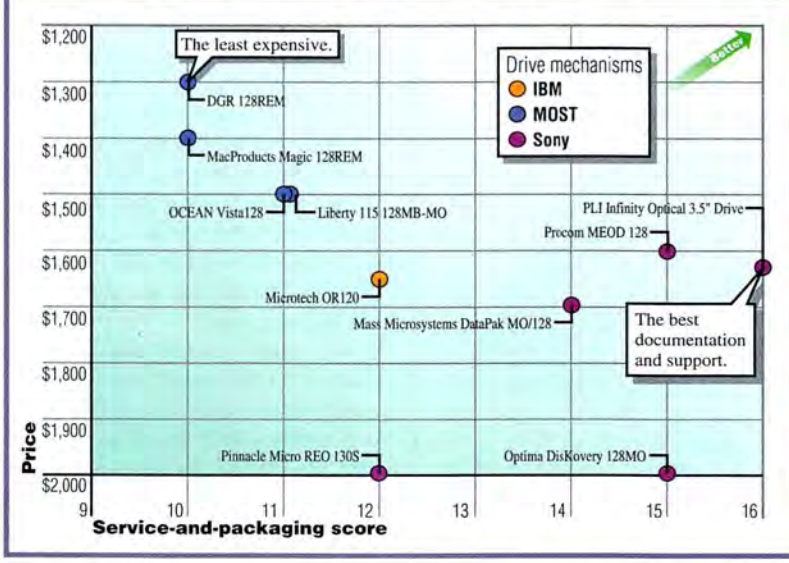


Figure 1: No matter how fast or well built a drive may be, if you can't figure out how to get it running, it's of little value. To get a handle on how much help each vendor provides, we rated each drive on the quality and the completeness of the packaging, the quality of the documentation, and the amount of service and support offered after the sale. We plotted each drive's street price against its service-and-packaging score. High scores are to the right of the chart, and the least expensive drives are at the top.

As for software documentation, all the vendors did well — most of the instructions were written by the driver publishers themselves. DGR includes a "light" version of FWB's Hard Disk ToolKit, which has perhaps the most detailed manual on all things SCSI and the functions of Hard Disk ToolKit itself. Liberty also did well in this category by including Appolyonics' SCSI Director software, which has its own detailed manual. MacProducts, Mass Microsystems, and Microtech ship versions of Software Architects' Formatter One, an easy-to-use all-purpose formatter. Optima and Pinnacle Micro ship proprietary formatters.

All the formatters did their job well in our tests and offered a variety of useful features, such as the ability to password-protect cartridges and partition them into separate volumes. The OCEAN and Pinnacle formatters are the only ones that fail to provide any extra features. DGR and MacProducts also include Retrospect Remote, a popular backup utility, and Microtech includes Symantec's Norton Utilities for the Macintosh, a powerful suite of utilities for recovering data. Retrospect and Norton Utilities are each $100 values, something to think about when considering the price of the drive.

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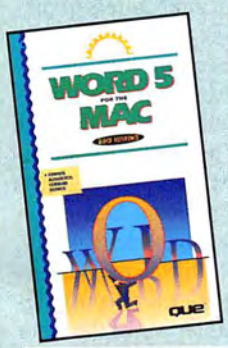


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Figure 2: Price Versus Performance

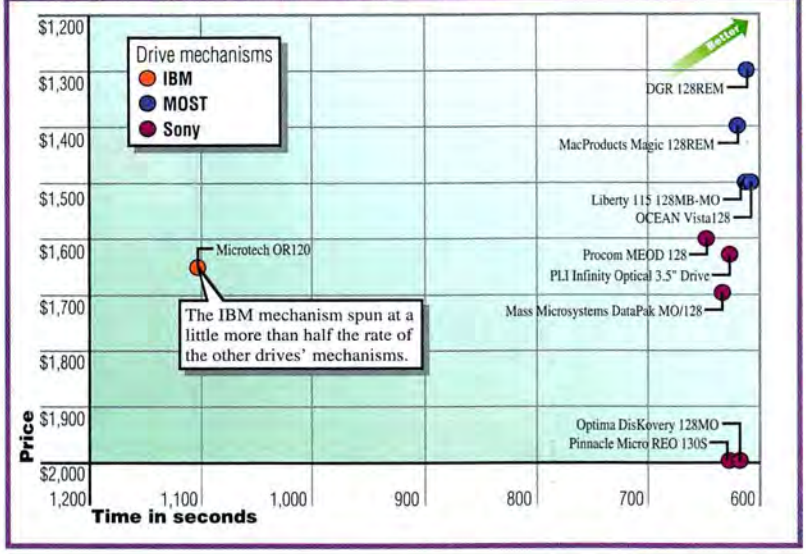


Figure 2: There was little speed difference in the drives we tested, except in the case of the 1,800-rpm Microtech OR120. We subjected each drive to our suite of real-world performance tests and found that rotational speed was the biggest differentiating factor. We plotted each drive's street price against the time, in seconds, that it took each drive to perform our tests. The faster drives are to the right of the chart, and the least expensive drives are at the top.

Figure 3: Price Versus Design and Construction

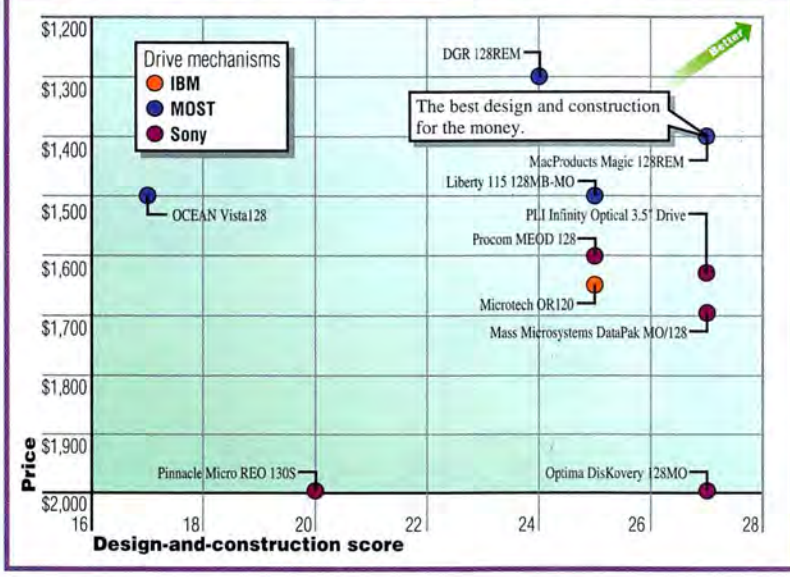


Figure 3: Because there is little difference in performance among the drives we tested, the quality of design and construction becomes a deciding factor. We looked at the conveniences each drive offered, such as accessible SCSI-ID selection and termination and how well built each drive's enclosure was. We plotted each drive's street price against its design-and-construction score. The best-built drives are to the right of the chart, and the least expensive drives are at the top.

Gentlemen, Start Your Opticals

Once we had formatted the cartridges, we copied the contents and file structures of the drives containing our test applications and files. After the copying was completed, we restarted the test platforms (Mac IIci's), using the optical drives as the startup devices. We immediately ran into trouble.

Most of the optical drives were unable to function as startup devices unless we "hid" the Finder on the Mac's internal hard drive in an unnamed folder — and even this worked only some of the time. This reluctance to function as a startup device can be a real pain if you're relying on your optical drive to be a mountable backup device — you may need to boot from it if your hard drive fails. Part of the problem is that these drives take some time to spin up. Some drive manufacturers are making changes to the mechanisms to fix this problem. Once we'd managed to get all the drives to function as startup devices, we subjected them to our suite of real-world performance tests.

With hard drives, speed varies greatly, because manufacturers implement different disk rotational speeds and different-sized caches, but the 3.5-inch optical drives we tested performed almost identically in all of our tests. The drives had relatively unsophisticated caches, making rotational speed the only significant factor, and only one drive, the Microtech OR120, which uses an IBM mechanism, spins its discs at a speed (1,800 rpm) significantly slower than that of the other drives. We tested each drive's access performance by sorting a 2,000-record 4th Dimension database. This test asks the drive to locate, sort, and write very small chunks of data, forcing the head to travel rapidly across the disc in search of that data.

All the drives, except for the Microtech OR120, were almost two-thirds as fast as a SyQuest 88. The OR120 was about half the speed of the other 3.5-inch optical drives. So if you base your buying decision on

speed alone, look for the cheapest drive you can find based on a Sony or a MOST mechanism, but do take construction quality into account.

Built to Last?

We looked at each drive's case to see if the drive was portable and allowed for vertical as well as horizontal installation. Mass Microsystems, Microtech, Optima, and Pinnacle provide removable feet to increase stability when the drives are vertically oriented.

We also looked for any extra AC outlets for connecting other drives and checked the location and type of the SCSI-ID selector. Only the DGR 128REM, the MacProducts Magic 128REM, and the Mass Microsystems DataPak MO/128 offer extra AC outlets.

All the drives offer either a push-button or a wheel SCSI-ID selector — acceptable means of setting SCSI-ID numbers. As for location, all the drives except for Liberty's and Pinnacle's have ID switches where they can't be changed accidentally. Liberty and Pinnacle didn't have much choice for ID-switch location, because they have compact, portable cases, but the Liberty 115 128MB-MO has a wheel-type switch that is hard to change inadvertently. The Pinnacle Micro REO 130S has a push-button switch located right next to the power switch, making it easy for you to change the ID number by accident while groping for the power switch.

We then opened all the cases and examined each drive's construction quality, making sure the drives had internal as well as external fuses, shielded power supplies to cut down on electronic interference, and cooling schemes. We preferred the metal cases used by DGR, Liberty, MacProducts, Mass Microsystems, OCEAN, and PLI, because of their sturdiness and because metal is better at dissipating heat. The Microtech OR120's case is plastic but has a conductive coating inside for reducing power-supply interference; the remaining drives have plastic cases that lack this preparation, and with the Optima DisKovery 128MO and the Pinnacle REO 130S, the plastic is too flexible. All the drives have internal fuses, but those from DGR, MacProducts, Mass Microsystems, Microtech, OCEAN, and PLI provide external fuses as well — an extra precaution and convenience in case a low-level surge hits your drive.

Cooling is critical in optical drives. The lasers the mechanisms use keep the inside of the mechanism hot. Most manufacturers prefer air to be drawn through the front of the mechanism,

Removable-Media Alternatives

When it comes to compact, removable-media drives, 3.5-inch optical drives aren't alone. Floppy drives that use optical tracking, for instance, have been around for a couple of years, but only recently have they gained any acceptance in the Mac community. There are two types of such drives: those based on the Insite Floptical mechanism and those based on the Brier mechanism. The Insite mechanism can store as much as 21 megabytes on a Floptical disk (which looks much like a floppy) and can also format, read from, and write to 800K and 1.2-megabyte floppy disks. According to Brier, its mechanism can store as much as 100 megabytes on a special disk but cannot format, read from, and write to floppy disks. The Brier and the Insite mechanisms are incompatible.

We looked at two Floptical drives based on the Insite mechanism, one from PLI and one from Procom. Each was well constructed and came with complete documentation. During testing we discovered that it's possible to eject a disk while the drive is writing to it, and if this happens, the entire disk often becomes unreadable. Furthermore, both drives had problems reading floppies that had been formatted on regular floppy drives.

The Quadram FLEXtra drive, which uses the Brier mechanism, proved even more troublesome. We looked at two of these drives and at two 25-megabyte Quadram disks and were unable to get any of them to work. Also, the mechanism of the second drive was partially unscrewed from its case, so it rattled around.

Other alternatives are coming soon from SyQuest: the Mesa, a 3.5-inch drive that can store 105 megabytes on a single cartridge, and the Iota, a 2.5-inch drive that can store 42 megabytes per cartridge. The Mesa draws a maximum of 4.5 watts, and the Iota draws a maximum of 2.5 watts. The Iota's low power draw and tiny size make it an ideal replacement for a PowerBook floppy drive. SyQuest claims that the Mesa and the Iota can outperform the company's current 5.25-inch drives.



Magnetic counterattack: Optical drives aren't the only new items on the removable-media-drive front. Newly announced drives include (from left) the PLI 21MB Floptical drive, the SyQuest 3.5-inch Mesa drive, and the SyQuest 2.5-inch Iota drive.

Not All Discs Are Equal

It doesn't matter how small or how well designed a removable medium is if it doesn't work when you put it in another drive. The key element for any storage product is data security — if you save your files on a disc, you need to know that you can go back to that disc at any time and retrieve your data, even if you're not using the drive that wrote the data on that disc. Unfortunately, this has not always been the case.

Apple has never set clear standards for driver writers to follow, which has resulted in the driver/system-extension compatibility problems we have come to dread with SyQuest drives. Apple hasn't made any effort to forge a standard, so expect this type of incompatibility to hobble 3.5-inch optical drives as well.

But users of SyQuest drives may have one up on users of 3.5-inch optical drives when it comes to compatibility. Currently there are at least ten manufacturers of 3.5-inch optical cartridges, and some are compatible with more drives than others are. Part of the problem lies with the ISO standard governing 3.5-inch optical drives, which allows a range of rotational speeds. With a slow-spinning — say, 1,800-rpm — drive, each data bit remains under the laser for twice as long as it does with a drive spinning at 3,600 rpm. The result is that the medium used for slower drives needs to be less *coercive* — in other words, it needs more time under the laser for the data bit to change. The problem is that if you put this medium into a faster-spinning drive, it's possible that a data bit won't be under the laser long enough for it to be changed.

To test the compatibility of 3.5-inch drives and cartridges, we acquired cartridges from Epson, Hoechst (which will carry the Dysan label in this country), Kuraray, Mitsubishi Kasei, MOST, Sony, 3M, Tosoh, and Verbatim and 3.5-inch drive mechanisms from IBM (MD3125A), MOST (RMD-5100-S), Ricoh (RMO 3010), Sony (SMO-P301), and Teac (OD 3000). We used Software Architects' Formatter One to format the cartridges on each mechanism. We then copied a 5.4-megabyte Photoshop file onto the disc, removed the cartridge, and inserted it into another mechanism to see if it could mount and read the file.

For the most part, things went smoothly. But the Teac mechanism did not accept either the MOST or the Tosoh cartridge. When either was inserted into the Teac mechanism, the mechanism spun down and its activity light flashed, indicating an error. The Teac mechanism also failed to format the Epson cartridge, although it could read it when the cartridge had been formatted on another mechanism. The Hoechst cartridge proved to be problematic for the MOST mechanism. The MOST mechanism could neither format nor read the Hoechst cartridge, and it could not read the Mitsubishi Kasei, 3M, and Verbatim cartridges if they had been formatted on the IBM mechanism. As for the 3M cartridge, the IBM mechanism could not read it when it was formatted on the MOST mechanism.

If exchanging cartridges is important to you — and it should be if you're considering a removable-media drive — take a close look at Table A. We found that the Sony and Ricoh mechanisms were compatible with the greatest variety of cartridges. On the media side, the Sony and Kuraray cartridges were compatible with the greatest number of mechanisms. Until Hoechst, MOST, and Tosoh do something to rectify their cartridges' compatibility problems, we do not recommend their cartridges.

Table A: Compatibility

● = compatible ○ = failed ◐ = could not test, because format failed

	Mechanism				
Cartridge (formatting mechanism)	IBM	MOST	Ricoh	Sony	Teac
Epson (IBM)	●	●	●	●	●
Epson (MOST)	●	●	●	●	●
Epson (Ricoh)	●	●	●	●	●
Epson (Sony)	●	●	●	●	●
Epson (Teac)	◐	◐	◐	◐	○
Hoechst (IBM)	●	○	●	●	●
Hoechst (MOST)	◐	○	◐	◐	◐
Hoechst (Ricoh)	●	○	●	●	●
Hoechst (Sony)	●	○	●	●	●
Hoechst (Teac)	●	○	●	●	●
Kuraray (IBM)	●	●	●	●	●
Kuraray (MOST)	●	●	●	●	●
Kuraray (Ricoh)	●	●	●	●	●
Kuraray (Sony)	●	●	●	●	●
Kuraray (Teac)	●	●	●	●	●
Mitsubishi Kasei (IBM)	●	○	●	●	●
Mitsubishi Kasei (MOST)	●	●	●	●	●
Mitsubishi Kasei (Ricoh)	●	●	●	●	●
Mitsubishi Kasei (Sony)	●	●	●	●	●
Mitsubishi Kasei (Teac)	●	●	●	●	●
MOST (IBM)	●	●	●	●	○
MOST (MOST)	●	●	●	●	○
MOST (Ricoh)	●	●	●	●	○
MOST (Sony)	●	●	●	●	○
MOST (Teac)	◐	◐	◐	◐	○
Sony (IBM)	●	●	●	●	●
Sony (MOST)	●	●	●	●	●
Sony (Ricoh)	●	●	●	●	●
Sony (Sony)	●	●	●	●	●
Sony (Teac)	●	●	●	●	●
3M (IBM)	●	○	●	●	●
3M (MOST)	○	●	●	●	●
3M (Ricoh)	●	●	●	●	●
3M (Sony)	●	●	●	●	●
3M (Teac)	●	●	●	●	●
Tosoh (IBM)	●	●	●	●	○
Tosoh (MOST)	●	●	●	●	○
Tosoh (Ricoh)	●	●	●	●	○
Tosoh (Sony)	●	●	●	●	○
Tosoh (Teac)	◐	◐	◐	◐	○
Verbatim (IBM)	●	○	●	●	●
Verbatim (MOST)	●	●	●	●	●
Verbatim (Ricoh)	●	●	●	●	●
Verbatim (Sony)	●	●	●	●	●
Verbatim (Teac)	●	●	●	●	●

across the optics, and out the back. All the drives we tested use cases common to the respective company's other storage products and contain fans designed to expel heat created by the internal power supply. However, most of the Sony mechanisms have extra fans directly attached to the mechanism for the specific purpose of cooling it. The Mass Microsystems drive is the only drive based on the Sony mechanism that lacks this fan. Although these extra fans do keep the mechanisms cool, they also increase the drives' noisiness. None of the drives based on the MOST mechanism have additional fans. The Microtech OR120 has only a single fan, but its IBM mechanism is open in the front and back, making it easy for the single fan to draw air through the mechanism. However, this design also increases the likelihood of dirt being drawn into the mechanism, possibly dirtying the optics.

To complete the construction-quality phase of our testing, we cut open each drive's SCSI cable to check its quality. The best cables — from Microtech, Optima, and Procom — have the internal data wires twisted with their respective ground lines to reduce noise from one line to another, foil insulation to lower impedance, and metal braid to protect the internal wires from cuts and fatigue. DGR and Pinnacle offer lower-quality cable, containing only foil insulation.

Is It Legit?

Once you've installed a drive on your desk, there's nothing more frustrating than finding that as soon as you power up the drive, the picture on your monitor starts to shimmy and your telephone line acquires a buzz. Hopefully, your office isn't in the flight path of the local airport, because that new drive may cause enough interference to confuse aircraft communications as well as interfere with police and other emergency communications.

To prevent such problems, the Federal Communications Commission has implemented strict rules on how much radio-frequency energy peripherals such as optical drives can emit. Unfortunately, few companies vigorously adhere to these rules.

For a peripheral to receive FCC certification, it must be tested for radio-frequency interference by an FCC-authorized laboratory and the results of those tests must be forwarded to the FCC, where commission engineers can either grant authorization or ask for further modifications and

On the Horizon

As 3.5-inch optical drives go, the newest development is the arrival of another MOST mechanism, which, aside from functioning like the current ISO-standard 3.5-inch optical mechanism, can also read from and write to proprietary 256-megabyte 3.5-inch discs. These discs, as well as offering double the capacity of ISO-standard discs, offer enhanced performance, because of higher track and bit densities.

At press time, Optical Access International began shipping a 3.5-inch optical drive based on a Panasonic mechanism and Relax and Rodime began shipping a drive based on the Ricoh RMO 3010. The Panasonic and Ricoh mechanisms are identical, both being made by Matsushita. These two mechanisms and the new Teac OD 3000 were slightly slower than the Sony SMO-P301 in our performance testing, but the Matsushita mechanisms' clean design and high level of media compatibility make them attractive. Sony has entered the 3.5-inch-optical-drive market directly by offering its own external drive. Although the drive is more expensive than the Sony-mechanism-based drives we tested, its enclosure is one of the best built we've seen.

Microtech has announced that it will be using the IBM MD3125B mechanism in all of its 3.5-inch optical drives as of May. This new version of the IBM mechanism spins at 3,000 rpm, promising to offer performance close to that of the Sony mechanism. The MD3125B also incorporates a built-in bezel with a self-closing door to reduce the chance of contamination of the drive's inner parts.

Chinon, Epson, Fujitsu, Olympus, Sharp, and Toshiba have also announced that they are now manufacturing 3.5-inch optical mechanisms.



The famous and not-so-famous: Big-name electronics maker Sony recently released its own drive (bottom) using (you guessed it) the Sony optical mechanism. Not quite so famous but equally new is Optical Access International's Aria drive, which is based on the Panasonic mechanism.

testing to bring the peripheral into compliance. Once the peripheral has passed the tests, the FCC gives the manufacturer a Grant of Certification, which certifies that the device has passed and indicates the FCC ID number to be attached to the peripheral.

For the ten drives we tested, only three vendors — Liberty, Microtech, and Procom — could provide us with verifiable FCC Grants of Certification. (The Procom drive, however, lacked an FCC ID number on its case.) Mass Microsystems, Pinnacle, and PLI provided us with copies of their results from the FCC laboratories, but they had yet to receive their Grants of Certification; they should have received them by the time you read this.

We were unable to verify the validity of the remaining drives' FCC ID numbers, either because the grants provided had numbers different from those on the drives or because the FCC's PAL (public-access line, a BBS that provides the name of the company holding the grant for any given FCC ID number) was unable to verify that the number was valid.

Worth the Wait

If you've been wanting a reliable means of storing important data or have longed for a compact way to take your data with you, the waiting is over. For the most part, the drives we looked at come with decent software and documentation. All the drives performed almost identically in our tests, with the exception of the slower-spinning Microtech drive. However, Microtech has since upgraded the IBM mechanism it uses from the MD3125A to the MD3125B, which promises to offer performance close to that of the Sony mechanism (see the "On the Horizon" sidebar).

If speed is your only concern, buy the cheapest drive you can find. If, like most folks, you value construction, software, and documentation, read "The Bottom Line" for our specific recommendations.

As our testing showed, speed is not a strength of 3.5-inch optical drives. But what these drives lack in speed, they more than make up for in data security. During the course of our testing, we had ample opportunity to drop, drag, dirty, and otherwise abuse our optical cartridges. To our delight, not one died during the course of our testing. If this is any sign of the durability of this medium, 3.5-inch optical drives look like the best solution we've seen so far for both data transportability and simple backup.

Mark Frost is a *MacUser* associate editor. John Rizzo, *MacUser*'s technical editor, has been covering optical storage for *MacUser* since 1988.

The Bottom Line

Each of the 3.5-inch optical drives we tested offers a high degree of data reliability and portability. Most of the drives exhibited similar performance, so base your buying decision on other factors such as price and construction quality. Our favorites were three drives based on the Sony SMO-P301 mechanism: the **Optima Technology DisKovery 128MO** ($2,295 list, $1,995 street), the **PLI Infinity Optical 3.5" Drive** ($1,999 list, $1,629 street), and the **Procom Technology MEOD 128** ($1,995 list, $1,600 street). These units have two fans for cooling, good documentation, good repair policies, and good construction quality (the PLI drive has a metal case and the Optima drive has high-quality shielding, for example).

We preferred drives based on the Sony mechanism over those based on the MOST RMD-5100-S because of the former's superior compatibility with a variety of cartridge brands. However, two drives based on the MOST mechanism offer good value for your money: The **DGR Technologies 128REM** ($1,299 direct) and the **MacProducts Magic 128REM** ($1,399 direct) are well built and were the least expensive of the drives we tested. In addition, each comes with Retrospect Remote and FWB's powerful Hard Disk ToolKit.

Regardless of the drive, we found that we could minimize compatibility problems if we used the right media. The Sony and the Kuraray cartridges were our favorite media for all the drives we tested.



Cream of the crop (from top): The Procom Technology MEOD 128, the PLI Infinity Optical 3.5" Drive, and the Optima Technology DisKovery 128MO offered the best combination of good documentation, design, and construction for the price.

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Table 2: Features of 3.5-Inch Magneto-Optical Drives

● = yes ○ = no	DGR 128REM 𝄞𝄞𝄞½	Liberty 115 128MB-MO 𝄞𝄞𝄞𝄞	MacProducts Magic 128REM 𝄞𝄞𝄞½	Mass Microsystems DataPak MO/128 𝄞𝄞𝄞𝄞
List price	$1,299	$1,499	$1,399	$1,799
Street price	$1,299	$1,499	$1,399	$1,725
Cartridge	$75	$59	$79	included
Pros	Least expensive. Good construction.	Comes with carrying cases. Inexpensive.	Inexpensive. Good construction.	Good documentation. Good construction.
Cons	Poor documentation.	Internal termination. Poor documentation. No toll-free tech support. No bundled software.	Poor documentation. No toll-free tech support.	
Hardware				
Formatted capacity	119.0 MB	119.4 MB	119.0 MB	119.4 MB
Internal mechanism	MOST RMD-5100-S	MOST RMD-5100-S	MOST RMD-5100-S	Sony SMO-P301
SCSI-ID selector	push button	wheel	push button	push button
SCSI termination	external	internal	external	external
Indicator lights	access, power	access, power	access, power	access, power
Size (L x W x H, in.)	10 x 9.5 x 2.5	9.5 x 7 x 2	10 x 9.5 x 2.5	10 x 10 x 2.5
Case material	metal	molded aluminum	metal	metal
External fuse	●	○	●	●
Fan	●	●	●	●
AC outlets	●, 2 switched	○	●, 2 switched	●, 2 switched
Vertical operation	●	●	●	●, with feet
Portable	○	●	○	○
Software				
Bundled software	Hard Disk ToolKit, Retrospect Remote	none	Hard Disk ToolKit, Retrospect Remote	SuperDisk, DiskDoubler
Formatter	HDT Primer 1.1	SCSI Director 1.9.7	HDT Primer 1.1	DataPak MO/128 Formatter
Partitioning	●	●	●	●
Backup	○	●	●	○
Password protection	●	●	●	○
Data encryption	●	○	●	○
File recovery	○	○	●	○
Disk optimization	○	○	●	○
Other				
Standard warranty	1 year	1 year	1 year	1 year
Money-back guarantee	30 days	30 days	30 days	none
Turnaround time	none	48 hours	5 days	48 hours
Extended warranty	○	○	○	○
Toll-free tech support	●	○	○	●
Data-recovery service	●	●	●	○
FCC certification	○	●	○	○
Company	DGR Technologies 1800 Rio Grande, Ste. 205 Austin, TX 78701 800-235-9748 512-476-9855	Liberty Systems, Inc. 160 Saratoga Ave., Ste. 38 Santa Clara, CA 95051 408-983-1127	MacProducts USA 608 W. 22nd St. Austin, TX 78705 800-622-3475 512-472-8881	Mass Microsystems, Inc. 810 W. Maude Ave. Sunnyvale, CA 94086 800-522-7979 408-522-1200

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CIRCLE 162 ON READER SERVICE CARD.

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Table 2: Features of 3.5-Inch Magneto-Optical Drives, continued

● = yes ○ = no	Microtech OR120 𝄞𝄞𝄞½	OCEAN Vista 128 𝄞𝄞𝄞½	Optima DisKovery 128MO 𝄞𝄞𝄞𝄞	Pinnacle Micro REO 130S 𝄞𝄞𝄞𝄞
List price	$2,599	$1,895	$2,295	$1,995
Street price	$1,649	$1,499	$1,995	$1,995
Cartridge	included	included	included	$79
Pros	Good construction. Good software bundle.	Good documentation.	Good documentation. Good formatting software.	Portable. Good documentation.
Cons	Slowest.	Minimal formatting software. No bundled software.	No toll-free tech support. No bundled software.	Minimal formatting software. No bundled software.
Hardware				
Formatted capacity	119.0 MB	119.0 MB	119.4 MB	119.0 MB
Internal mechanism	IBM MD3125A	MOST RMD-5100-S	Sony SMO-P301	Sony SMO-P301
SCSI-ID selector	push button	push button	push button	push button
SCSI termination	external	external	external	external
Indicator lights	access, power	power	access, power	access, power
Size (L x W x H, in.)	10.5 x 10 x 2.5	10.5 x 10 x 3	10 x 11.5 x 2.5	8.5 x 7 x 2
Case material	plastic with EMI	metal	plastic	plastic
External fuse	●	●	○	○
Fan	●	●	●	●
AC outlets	○	○	○	○
Vertical operation	○	●	●, with feet	●, with feet
Portable	○	○	○	●
Software				
Bundled software	Norton Utilities, LifeGuard	none	none	none
Formatter	OR 120 Formatter 3.47	Compass Works 4.33	DiskMount	REO Formatter 2.52
Partitioning	●	○	●	○
Backup	○	○	○	○
Password protection	○	○	●	○
Data encryption	○	○	○	○
File recovery	●	○	○	○
Disk optimization	●	○	○	○
Other				
Standard warranty	2 years	1 year	1 year	1 year
Money-back guarantee	none	none	30 days	30 days
Turnaround time	48 hours	5 days	48 hours	48 hours
Extended warranty	none	none	$345/3 years	$485/year
Toll-free tech support	●	●	○	●
Data-recovery service	●	●	●	○
FCC certification	●	○	○	○
Company	Microtech International, Inc. 158 Commerce St. East Haven, CT 06512 800-626-4276 203-468-6223	OCEAN Microsystems 246 E. Hacienda Ave. Campbell, CA 95008 800-262-3261 408-374-8300	Optima Technology 17526 Von Karman Irvine, CA 92714 714-476-0515	Pinnacle Micro, Inc. 19 Technology Irvine, CA 92718 800-553-7070 714-727-3300

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Table 2: Features of 3.5-Inch Magneto-Optical Drives

● = yes ○ = no	PLI Infinity Optical 3.5" Drive $$$$	Procom MEOD 128 $$$$
List price	$1,999	$1,995
Street price	$1,629	$1,600
Cartridge	included	included
Pros	Good documentation. Good construction. Good formatting software.	Good documentation. Good construction. Good formatting software.
Cons	No bundled software.	No bundled software.
Hardware		
Formatted capacity	119.4 MB	119.5 MB
Internal mechanism	Sony SMO-P301	Sony SMO-P301
SCSI-ID selector	wheel	wheel
SCSI termination	external switch	external
Indicator lights	power	power
Size (L x W x H, in.)	10 x 10 x 2.5	10.5 x 9.5 x 2
Case material	metal	plastic
External fuse	●	○
Fan	●	●
AC outlets	○	○
Vertical operation	●	●, with feet
Portable	○	○
Software		
Bundled software	none	none
Formatter	PLI Formatter 3.3	Procom 3.1
Partitioning	●	●
Backup	○	○
Password protection	○	●
Data encryption	○	○
File recovery	○	○
Disk optimization	●	○
Other		
Standard warranty	1 year	1 year
Money-back guarantee	30 days	none
Turnaround time	48 hours	48 hours
Extended warranty	$199/year	$398/year
Toll-free tech support	●	●
Data-recovery service	●	●
FCC certification	○	●
Company	PLI 47421 Bayside Pkwy. Fremont, CA 94538 800-288-8754 510-657-2211	Procom Technology 2181 Dupont Dr. Irvine, CA 92715 800-800-8600 714-852-1000

Table 2 Criteria

List price — The manufacturer's suggested retail price.
Street price — An average actual price charged by dealers around the U.S. in April 1992.
Formatted capacity — The amount of usable storage space on a single cartridge after formatting, in megabytes.
Internal mechanism — The OEM name and model number of the disk mechanism used in the drive. Double-check with the vendor to see if it uses different mechanisms in the same-model drive.
SCSI-ID selector — The method used to change the SCSI-ID number.
SCSI termination — The location of the SCSI termination used by the drive.
Indicator lights — What the lights (if any) on the front of the drive indicate.
External fuse — Does the drive have an external fuse?
Fan — Does the drive have a fan to keep its power supply cool?
Portable — Is the drive small enough to fit in a handbag or small briefcase?
Bundled software — Commercial applications, utilities, and shareware that come with the drive.
Formatter — Software for formatting the drive for use with a Mac.
Partitioning — Does the drive come with software that lets you partition a disc into separate volumes?
Backup — Does the drive come with software that lets you copy files to other media for safekeeping?
Password protection — Does the drive come with software that prevents others from accessing data unless they have a password?
Data encryption — Does the drive come with a method of scrambling disc contents to prevent others from accessing data unless they have the correct password?
File recovery — Does the drive come with a utility for rescuing deleted or damaged files?
Disk optimization — Does the drive come with a utility for reorganizing its contents into contiguous blocks to improve performance?
FCC certification — Was the vendor able to provide a verifiable FCC Grant of Certification?

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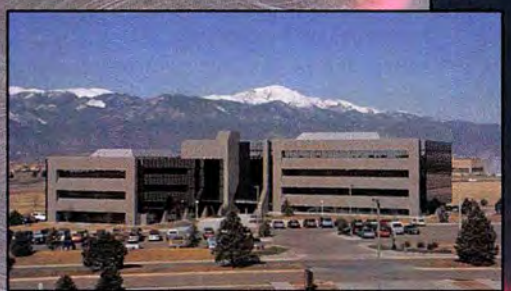


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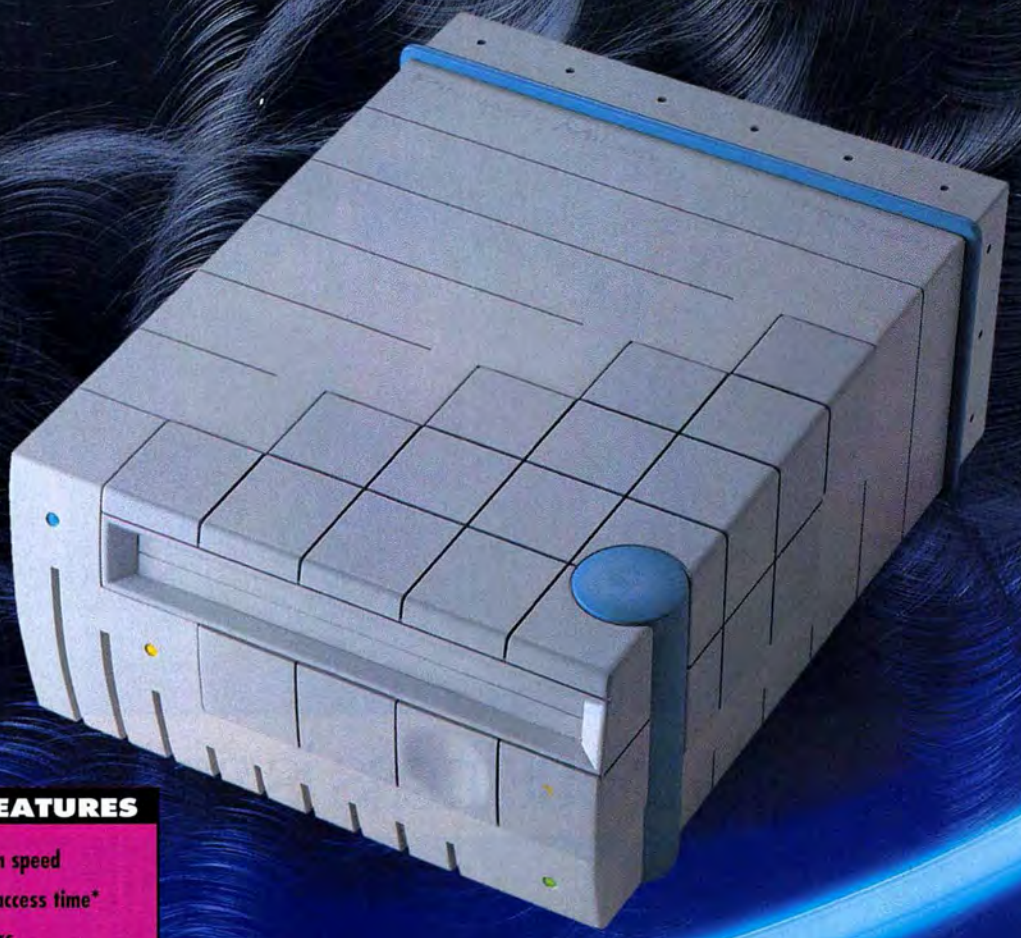
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5.25-Inch Magneto-Optical Mechanisms

Anyone who has ever needed to restore years of financials for an audit and had to fumble desperately with corrupted tape under the nerve-wracking gaze of an IRS agent can appreciate the importance of data integrity — and the simplicity of optical storage. An optical cartridge provides far greater data security than a magnetic medium such as tape does, and optical drives are much easier to use than are tape drives, which have the additional disadvantage of not being desktop-mountable.

Unfortunately, magneto-optical (MO) mechanisms have historically been hobbled by slow performance and high costs: When we last took a look at 5.25-inch optical mechanisms (see "Maximum Movable Megabytes: Erasable Optical Drives," November '90, page 102), they weren't cost-effective until storage needs exceeded 650 megabytes. But thanks to falling prices for 3.5-inch optical drives, prices of 5.25-inch optical drives are also coming down — and performance is improving.

What this means for network administrators; production managers; and others charged with storing, retrieving, and transporting huge files or large quantities of files is that high-performance 5.25-inch optical drives are no longer just an exotic alternative but are actually a practical storage solution at a reasonable price: Drives that cost around $5,000 two years ago are now available for less than $3,000.

For this report, MacUser Labs tested three leading 5.25-inch optical mechanisms — the Maxoptix Tahiti II, the Ricoh Hyperspace, and the Sony E501. We designed our test suite around four real-world applications that exercise the various components that influence a mechanism's speed (see Figure 1).



PHOTOGRAPHY: STAN MUSILEK

Keep in mind as you read this report that these mechanisms are not stand-alone products: They are packaged by drive vendors and come with various levels of service, warranty, and other extras. Pick the mechanism you like, choose the vendor that bundles the right mix of features to best meet your needs, and then shop for the best price (see the directory at the end of this Buyer's Guide). At press time, we found drives based on these mechanisms in the $2,500-to-$4,000 price range — for example, a Sony E501-based drive for $2,895, a Ricoh Hyperspace-based drive for $2,999, and a Maxoptix Tahiti II-based drive for $3,699.

Mechanism Features

All three mechanisms use MO technology to read data from and write it to ISO-standard 650-megabyte optical-disc cartridges. (See the "How It Works: Magneto-Optical Drives" sidebar in "Pocket Opticals: 3.5-Inch Magneto-Optical Drives" in this Buyer's Guide.) Thus, you can swap cartridges freely among all three mechanisms. The mechanisms read only one 325-megabyte side at a time, so you must remove, flip, and reinsert a cartridge to access data on the other side.

In addition to the standard format, the Maxoptix Tahiti II reads from and writes to its own proprietary 1-gigabyte optical cartridges, using the ZCAV (zoned constant angular velocity) formatting scheme. Similar to zone-bit recording on magnetic mechanisms, ZCAV formatting enables greater capacity by packing an increasing number of sectors per track on

Figure 1: Performance of 5.25-Inch Magneto-Optical Mechanisms

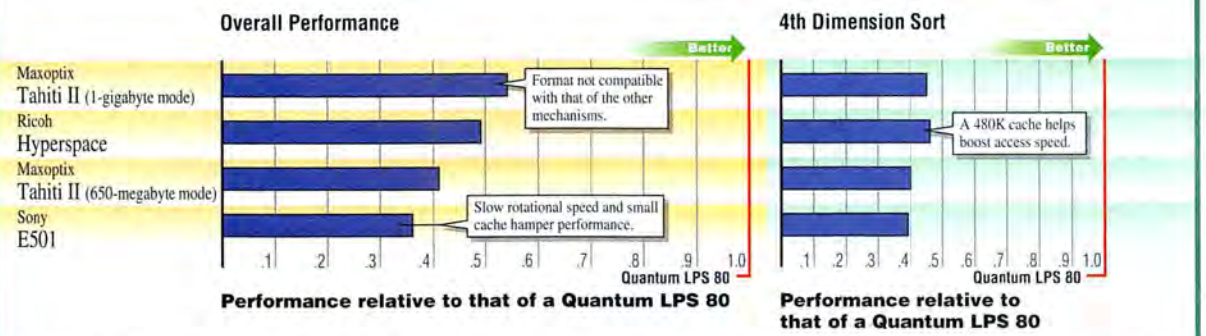


Figure 1: Optical cartridges are one of the most fail-safe storage solutions available, but the mechanisms that use them are slower than most hard-disk mechanisms. We tested three leading mechanisms, using four real-world applications, because different applications move data in different-sized pieces and involve different aspects of a mechanism's operation — for example, a database program such as 4th Dimension uses a drive differently from the way an image-manipulation program such as Photoshop does.

Overall Performance:

We compared all our test results with those of a Quantum LPS 80 mechanism. The Maxoptix Tahiti II in 1-gigabyte mode was the fastest of the 5.25-inch optical mechanisms, followed closely by the Ricoh Hyperspace and the Maxoptix Tahiti II in 650-megabyte mode. The Sony E501, with its slow rotational speed and small cache, brought up the rear. Unfortunately, cartridges you use with the Maxoptix Tahiti II in 1-gigabyte mode won't work with the other mechanisms. In 650-megabyte mode, however, the Maxoptix Tahiti II is completely compatible with all ISO-standard mechanisms.

4th Dimension Sort:

Sorting in 4th Dimension taxes a mechanism's access speed — how fast the head can find and get data from the disc. The Ricoh Hyperspace was the fastest, edging out the Maxoptix Tahiti II in 1-gigabyte mode. The Ricoh Hyperspace has the fastest rotational speed of all the mechanisms, which reduces access time by bringing the correct sector under the head quickly, and its 480K cache holds more data at the ready once it gets there. Despite its slower rotational speed, the Maxoptix Tahiti II in 1-gigabyte mode achieves relatively fast access, because it packs a large number of sectors per track.

successive tracks toward the outer edge of the disc. ZCAV formatting also provides higher transfer rates than does ISO-standard formatting by allowing more sectors to pass under the mechanism's head with each revolution of the cartridge disc. So although the Maxoptix Tahiti II spins discs at a middle-of-the-road 2,200 rpm, when it's using ZCAV-formatted cartridges, it's faster than either the 3,600-rpm Ricoh Hyperspace or the 2,400-rpm Sony E501.

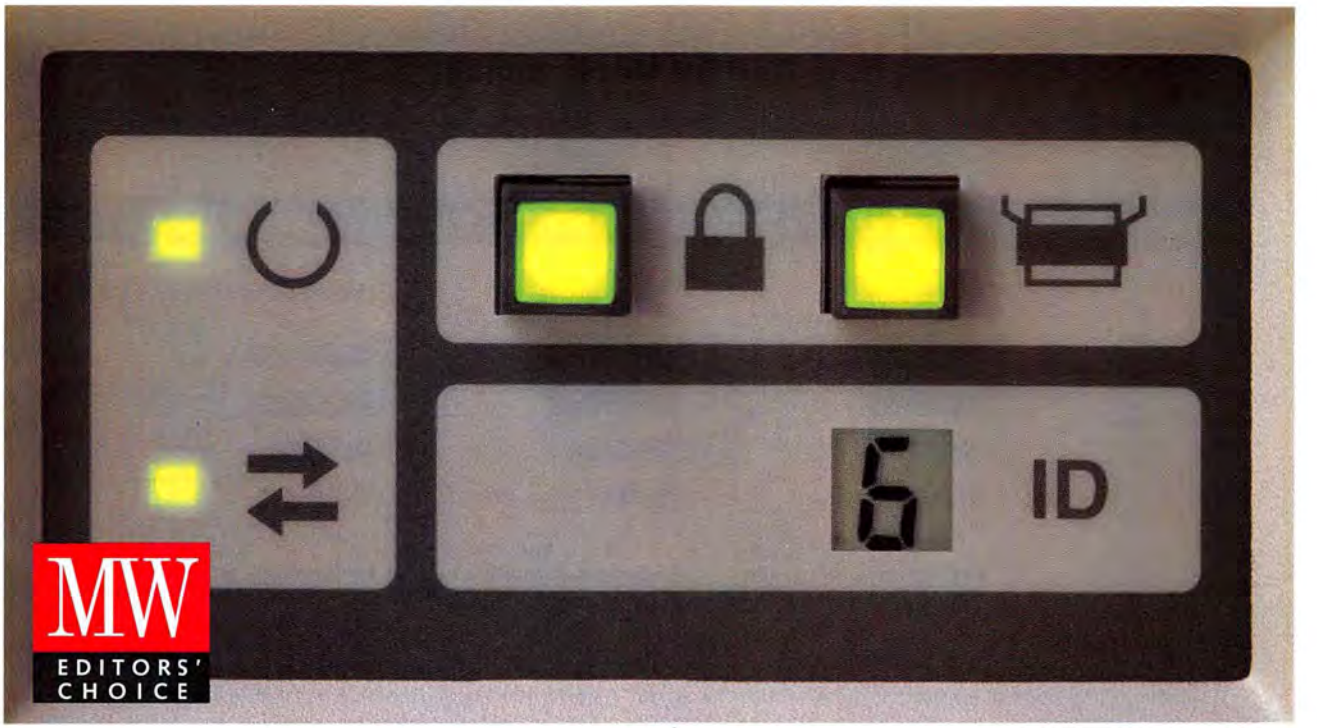
But reading older media on these newer mechanisms may be a problem. Fortunately, the Ricoh Hyperspace offers backward compatibility with earlier cartridges by spinning at 1,800 rpm if need be and at 3,600 rpm when possible. When a cartridge is inserted into the mechanism, the Ricoh Hyperspace compares it with a qualification list in read-only memory; only if the cartridge meets the criteria will the mechanism read and write at the higher speed.

Performance Issues

Many factors besides rotational speed influence a mechanism's overall speed. Historically, MO mechanisms have been slow, because writing is a three-pass operation: a section of the disc is first erased, then written to, and then read from to verify that the write was successful (write with verify). Skipping the verify pass can improve speed by about a third. The Maxoptix Tahiti II and the Sony E501 write without verify by default, although all three mechanisms can be configured through jumper settings or FWB's Hard Disk ToolKit to write without verify.

Disabling the write-with-verify feature provides the single largest performance gain: We tested all three mechanisms with write with verify on and with it off and found all three to be about 30 percent faster when write with verify was disabled. However, if you'll be using the optical mechanism for backing up or doing long-term archiving, leave write with verify on, because data integrity is more important than speed in this situation. With write with verify off, you have no way of telling if the write was unsuccessful until it's too late — when an auditor's breathing down your neck, for example.

Another factor that improves performance is caching — the Maxoptix Tahiti II has a 128K read cache, the Ricoh Hyperspace has a 480K read/write cache, and the Sony E501 has a 64K read cache. Unfortunately, the Ricoh Hyperspace's write cache is not turned on by default, and the mechanism doesn't yet have a jumper for turning it on: If you want to engage the Ricoh Hyperspace's write cache, you must use an application such as Hard Disk ToolKit to do so. Unfortunately, changes made with Hard Disk ToolKit on removable-media mechanisms are temporary: You must turn the write cache on each time you reboot your Mac or insert a cartridge



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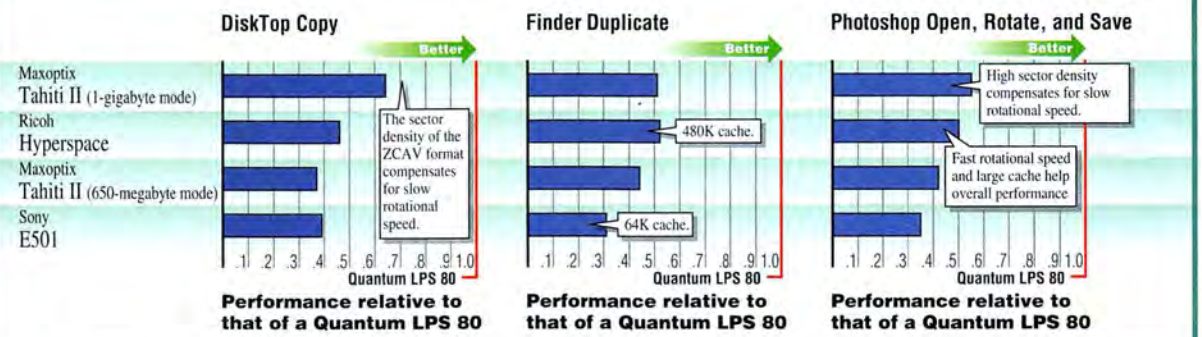
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Figure 1: Performance of 5.25-Inch Magneto-Optical Mechanisms, continued



DiskTop Copy:

DiskTop copies data by passing it in large chunks, each usually greater than the size of the mechanism's cache, so using it for copying tests a mechanism's sustained throughput. The Maxoptix Tahiti II in 1-gigabyte mode was the fastest of the 5.25-inch optical mechanisms. Once again, even though the Maxoptix Tahiti II's rotational speed is less than that of the Ricoh Hyperspace, more data can pass under the head in the same amount of time, because more sectors are packed into each track. The Sony E501 was faster than the Maxoptix Tahiti II in 650-megabyte mode, because it spins 200 rpm faster.

Finder Duplicate:

In addition to being a common operation, duplicating files in the Mac Finder provides some measure of a mechanism's seek capability: Because the Finder moves data in small pieces, the mechanism must read from source sectors and write to destination sectors of the disc in rapid succession, exercising the head's *actuator*— the mechanical part that moves the head from track to track on the disc — and the mechanism's cache. The Ricoh Hyperspace was the fastest of the 5.25-inch optical mechanisms, slightly surpassing the Maxoptix Tahiti II in 1-gigabyte mode. The Sony E501, with its slower rotational speed and relatively small buffer, was last.

Photoshop Open, Rotate, and Save:

Because it uses the disc for virtual memory, Photoshop exercises all aspects of mechanism operation. We opened, rotated, and saved a 5.4-megabyte image in Photoshop. In all three tests, the Maxoptix Tahiti II in 1-gigabyte mode was the fastest, followed by the Ricoh Hyperspace, then the Maxoptix Tahiti II in 650-megabyte mode, and finally the Sony E501. The 1-gigabyte Tahiti II was much faster than the rest in the open and rotate tests, and the Sony E501 was much slower than the rest in the save test.

into the mechanism. It's possible that a system extension could be designed to automatically turn on the Ricoh Hyperspace's write cache each time a cartridge is inserted, but such an extension was not available at test time.

The Bottom Line

If you want an optical drive for storing and transporting large files — and high performance and interchangeability are top priorities — you have two good options: A drive based on the Maxoptix Tahiti II offers the highest performance and capacity when the mechanism is operating in its proprietary 1-gigabyte mode and full interchangeability in its 650-megabyte mode. But our first pick is a drive based on the Ricoh Hyperspace, which offers near-Tahiti II performance and costs only a few dollars more than a drive based on the Sony E501.

For those who want an optical drive for backup purposes only, data security and low price are priorities. Although it was the slowest of the three mechanisms we tested, the Sony E501 has a rock-bottom price, which makes drives that use it your best pick for safe, inexpensive desktop-mountable backup.

— Mark Frost and the MacUser Labs staff

Table 1: Features

	Maxoptix Tahiti II	Ricoh Hyperspace	Sony E501
Pros	High capacity and high speed in 1-gigabyte mode.	Fast. ISO standard. Inexpensive.	Least expensive.
Cons	Expensive. 1-gigabyte mode not ISO standard.		Slow.
Capacity	650 MB, 1 GB	650 MB	650 MB
Format	ISO, ZCAV	ISO	ISO
Rotational speed	2,200 rpm	3,600 rpm	2,400 rpm
Cache size	128K	480K	64K
Jumper-settable	yes	no	yes
Write-with-verify default	no	yes	no
Jumper-settable	yes	yes	yes

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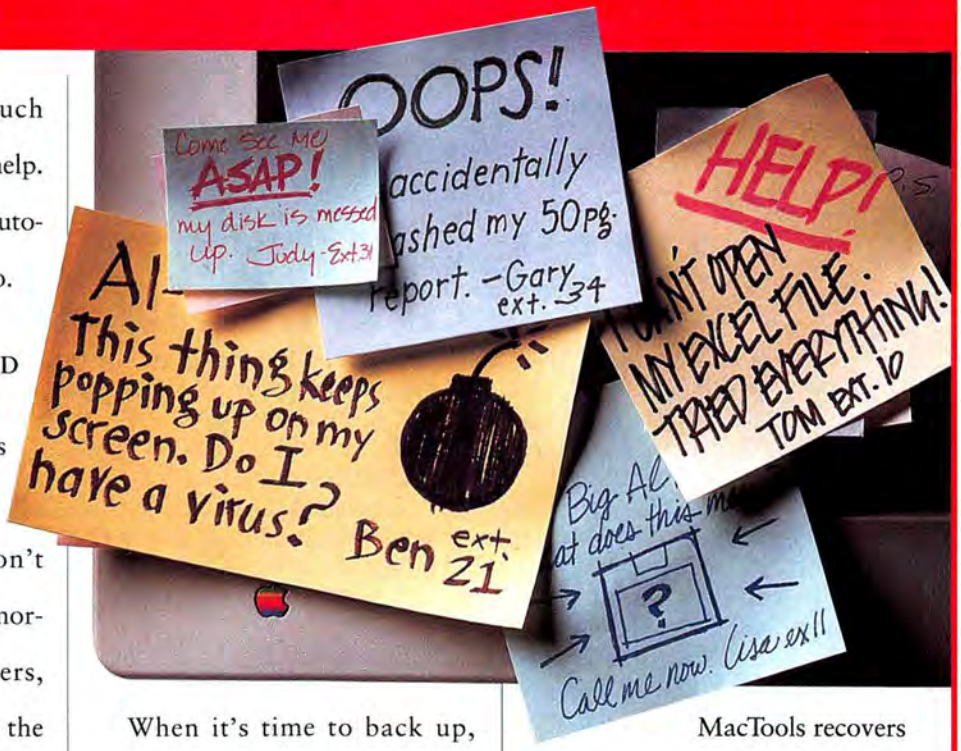
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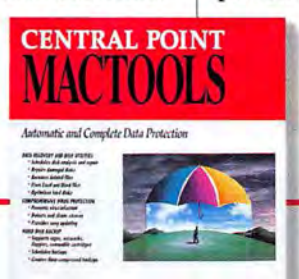


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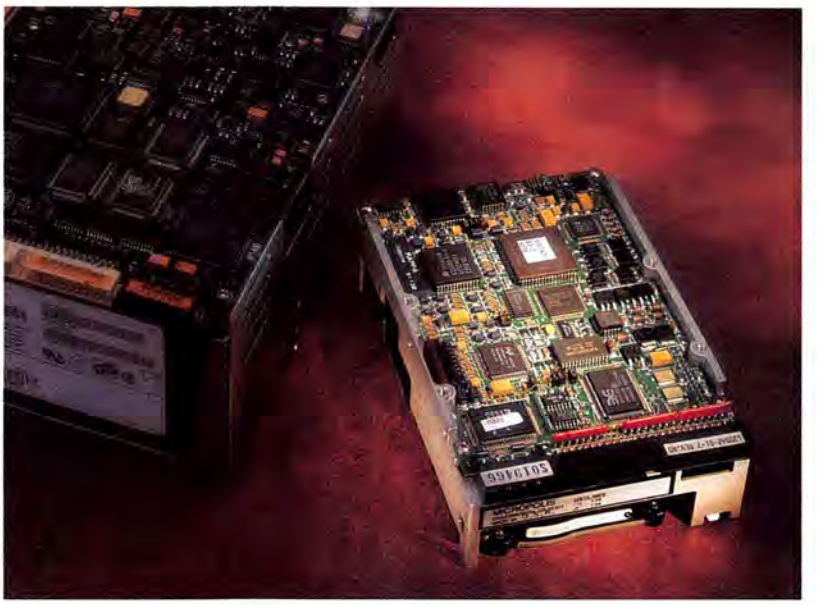
3.5-Inch Gigabyte Hard-Disk Mechanisms

There's no such thing as too much room on a hard disk, especially for network file services or work involving 24-bit-color graphics. For such applications, a gigabyte hard drive is far from overkill. Until recently, though, gaining the advantage of that much storage forced you to spend at least $4,000.

Earlier this year, a handful of manufacturers of hard-disk mechanisms, some of which are newcomers to the hard-disk-OEM world — IBM and Digital, for example — introduced several 3.5-inch gigabyte hard-disk mechanisms. Thanks to its small size and minimal power requirements, a 3.5-inch gigabyte mechanism can store more than one billion bytes of data in the same amount of space as an old Quantum 80-megabyte mechanism: The small, sleek 3.5-inch mechanisms mount neatly into Macs such as the IIci and the Quadra 700, and most require less than 15 watts of power, compared with the 33 watts needed by a Seagate Elite-1 (an exemplary 5.25-inch mechanism used in many third-party products for the Mac).

Not only are the new 3.5-inch mechanisms smaller and less power-hungry but they're also, for the most part, faster than their 5.25-inch counterparts. And performance matters, particularly with the network and graphics applications for which drives of this capacity are so well suited. One last bit of good news is that prices of drives using these mechanisms are expected to be in the neighborhood of $2,500.

To give you a peek at what will soon be coming down the storage pike, we rounded up six cutting-edge 3.5-inch gigabyte hard-disk mechanisms: the Digital DSP3085 and DSP3105, Hewlett-Packard C2247, IBM 0663-H12, Micropolis 2112, and Toshiba MK-438FB. We ran each mechanism through a test suite of four real-world applications that involve the various factors that influence a mechanism's speed (see Figure 1).



PHOTOGRAPHY: STAN MUSILEK

These mechanisms are not commercial products but are instead packaged by drive vendors with various levels of service, warranty, and other extras such as partitioning software for carving up some of those millions of megabytes into more manageable pieces (see "Gigadrives: The 1,000-Megabyte Solution," July '91, page 140). Pick the mechanism you like, choose the vendor that bundles the right mix of other features to best meet your needs, and then shop for the best price (see the directory at the end of this Buyer's Guide).

Mechanism Features

The six 3.5-inch mechanisms we looked at each hold around a gigabyte of data. Formatted capacities range from the Digital DSP3085's 852 megabytes to the IBM 0663-H12's 1.05 gigabytes. All support the Fast-SCSI-2 specification and are capable of sustained data-transfer rates as high as 10 megabytes per second (see "Supercharging the SCSI Bus: SCSI-2 Cards," elsewhere in this Buyer's Guide).

Hewlett-Packard sets a high-quality standard with a five-year manufacturer's warranty; Digital offers a two-year warranty, with one-year extensions available (which will no doubt bump up the cost of the drive). The other mechanisms come with a one-year manufacturer's warranty, which really isn't long enough for such a critical — and costly — piece of hardware. Hopefully, vendors will

Figure 1: Performance of 3.5-Inch Gigabyte Hard-Disk Mechanisms



Figure 1: The amount of data that gets written or read in a given time — throughput — depends primarily on a mechanism's rotational speed and the number of sectors per track. Other factors that involve the simple mechanics of finding data on the platters also affect throughput. Some manufacturers rely on high rotational speeds to enhance performance, some rely on large caches, and others do both.

Overall Performance:

We connected each mechanism to a Mac IIci and ran it through the same set of tests used for the other lab reports in this month's Buyer's Guide. We sorted a 4th Dimension database to gauge access speed; copied a 13-megabyte file, using DiskTop, to examine sustained throughput; duplicated a large file in the Finder to see how the mechanism's speed might be helped by its cache; and finally, opened, rotated, and saved an image in Photoshop to exercise all aspects of mechanism operation as well as to see whether faster mechanisms improved performance with this disk-bound application. We normalized all results to those of a Seagate Elite-1, a 5.25-inch gigabyte hard-disk mechanism. Overall, the Digital mechanisms led the pack, with the DSP3105 just edging out the DSP3085. Next came the Hewlett-Packard C2247, followed by the Micropolis 2112 and the the IBM 0663-H12. The Toshiba MK-438FB was last.

4th Dimension Sort:

To test access time, we sorted a 2,000-record 4th Dimension database to see how quickly the heads found and retrieved data from the disk. The Digital DSP3105 and DSP3085 were the fastest. The Hewlett-Packard C2247 came next, followed by the Micropolis 2112 and the slightly-slower-spinning IBM 0663-H12. Predictably, the Toshiba MK-438FB, which has the slowest rotational speed, was last.

supplement manufacturers' warranties or provide data-recovery services, should the need arise. (As we went to press, IBM announced another new 3.5-inch gigabyte mechanism, the IBM 0663-E15, which will have a five-year warranty.)

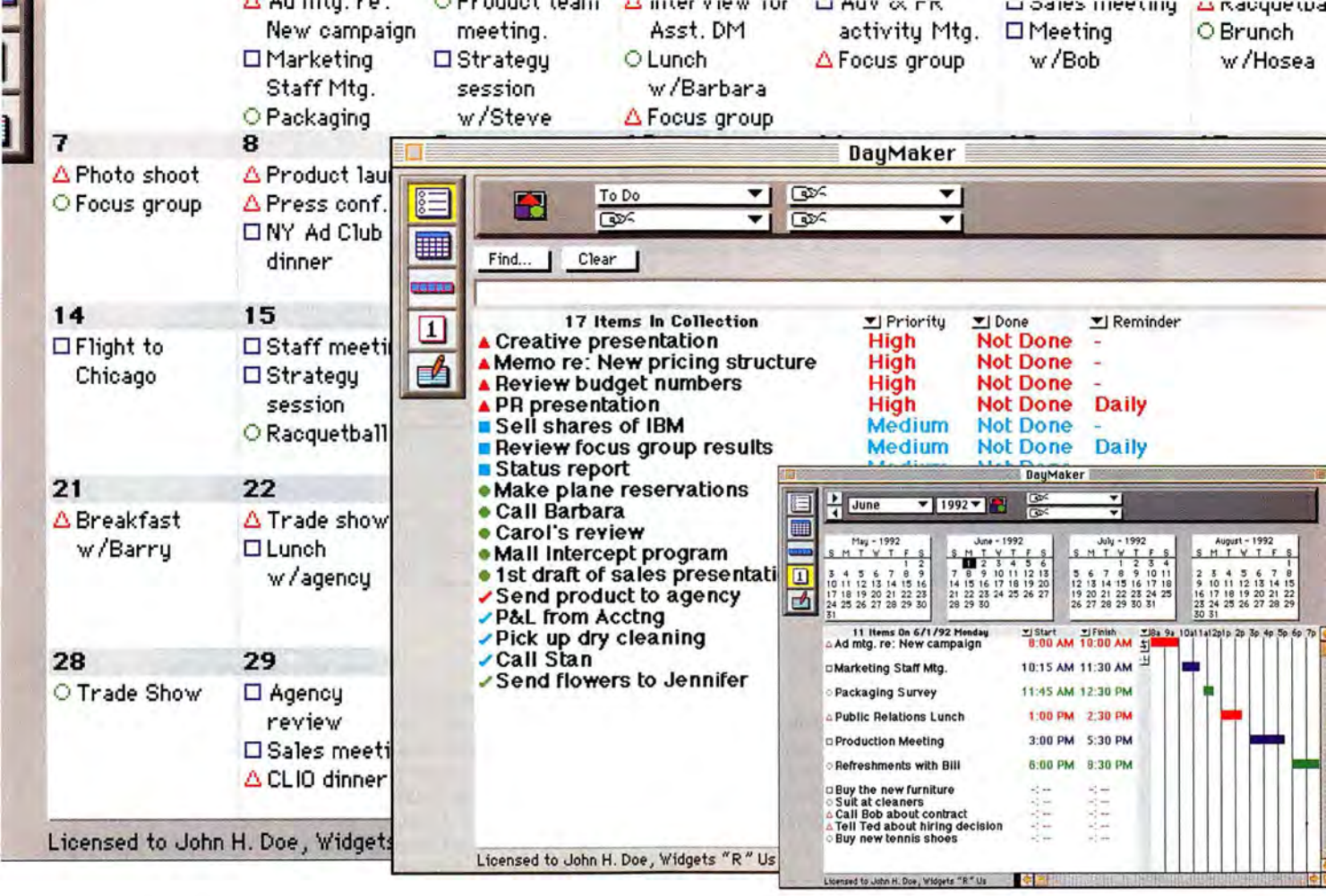
Performance Issues

Hard-disk mechanisms contain disks, or platters, that store data in concentric circles, called tracks. The platters rotate at a steady speed while an *actuator* moves heads from track to track, reading data from and writing it to the platters. The time it takes the actuator to position the heads over the right track (the seek time) and the time it takes for the correct sector to rotate under the heads both affect the access time. Throughput — how much data actually gets written or read in a given period of time — is determined primarily by a combination of a mechanism's rotational speed and the number of sectors per track. For example, the Hewlett-Packard C2247, the Micropolis 2112, and the Toshiba MK-438FB all use the *zone-bit recording* method, which lays down a variable number of sectors per track — as many as 85 sectors on the outermost track and almost half that number on the innermost track — whereas the Digital DSP3085 and DSP3105 have a consistent number of sectors per track.

Smaller-sized platters mean shorter

Table 1: Features

	Digital DSP3085	Digital DSP3105	Hewlett-Packard C2247
Pros	Fast. Consistent performance across disks.	Fastest. Consistent performance across disks.	Fast. Five-year warranty.
Cons			Speed decreases as disks fill.
Capacity	852 MB	1.05 GB	1.05 GB
Recording method	nonbanded	nonbanded	zone-bit
Rotational speed	5,400 rpm	5,400 rpm	5,400 rpm
Cache size	512K	512K	256K
Sectors per track	85	85	variable



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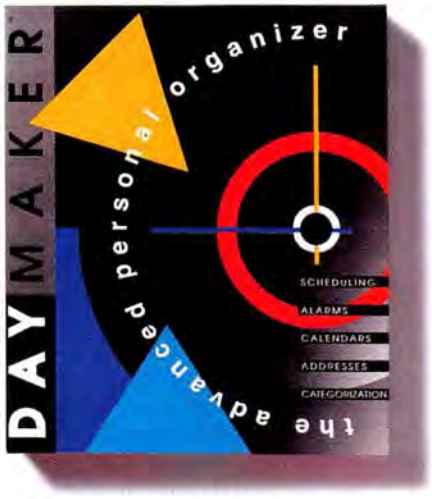
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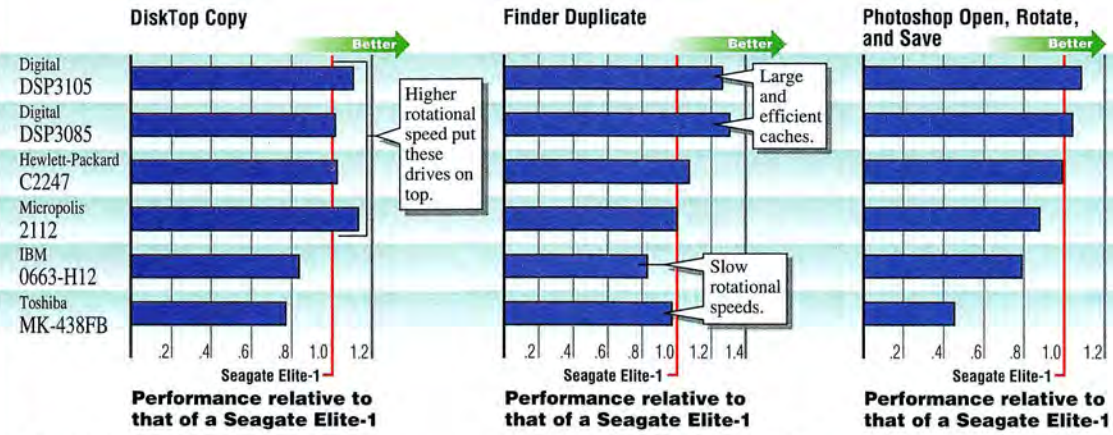
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Figure 1: Performance of 3.5-Inch Gigabyte Hard-Disk Mechanisms, continued



DiskTop Copy:

We examined the sustained throughput of each mechanism by copying a 13-megabyte file with DiskTop, an application that moves data in very large chunks. The Micropolis 2112 edged out the Digital DSP3105 to be the winner in this test. The Hewlett-Packard C2247 and the Digital DSP3085 were close behind, followed by the IBM 0663-H12 and the Toshiba MK-438FB.

Finder Duplicate:

The Finder moves data in small chunks, so using it to duplicate a file gives a good indication of how well the cache works. The Digital DSP3105 and DSP3085 came out on top again, thanks to their large caches (512K), efficient cache algorithms, and high rotational speeds. The Hewlett-Packard C2247, with the same rotational speed but a smaller (256K) cache, came in third. The Micropolis 2112's inefficient cache hobbled this mechanism in this test, leaving it in fourth place.

Photoshop Open, Rotate, and Save:

We stressed all aspects of mechanism operation by opening, rotating, and saving a 5.4-megabyte image in Photoshop. The Digital DSP3105 once again took top honors, followed closely by the Digital DSP3085, the Hewlett-Packard C2247, and the Micropolis 2112. The Toshiba MK-438FB, which took much longer to find data because of its slow rotational speed, finished last.

access times — the heads travel shorter distances to reach the correct track. But rotational speed — how fast a mechanism's platters rotate — affects almost all aspects of performance. High rotational speed can help reduce access time by bringing the correct block under the heads quickly. High rotational speed also increases sustained throughput by passing more blocks under the head in a given time. The Digital DSP3085 and DSP3105, the Hewlett-Packard C2247, and the Micropolis 2112 spin their disks the fastest, at 5,400 rpm. The IBM 0663-H12 has a rotational speed of 4,300 rpm, and the Toshiba MK-438FB has the slowest rotational speed of the lot, 3,600 rpm.

Performance can be boosted with the help of a cache. The Digital DSP3105 and DSP3085 and the Micropolis 2112 have 512K read/write caches, the Hewlett-Packard C2247 has a 256K read/write cache, and the IBM 0663-H12 and the Toshiba MK-438FB each have a 256K read cache.

Table 1: Features, continued

	IBM 0663-H12	Micropolis 2112	Toshiba MK-438FB
Pros	Consistent performance across disks.	Fast.	Lowest power requirement.
Cons	Slow.	Speed decreases as disks fill.	Slowest. Speed decreases as disks fill.
Capacity	1.2 GB	1.05 GB	867 MB
Recording method	nonbanded	zone-bit	zone-bit
Rotational speed	4,300 rpm	5,400 rpm	3,600 rpm
Cache size	256K	512K	256K
Sectors per track	66	variable	variable

The Bottom Line

In our tests, the Digital mechanisms led the pack, with the 1.05-gigabyte DSP3105 just ahead of the 852-megabyte DSP3085. Next was the Hewlett-Packard C2247, followed by the Micropolis 2112. The IBM 0663-H12 and the Toshiba MK-438FB mechanisms were considerably slower overall. Nonetheless, 3.5-inch gigabyte mechanisms hold the promise of high speed and large capacity in a sleek form. At press time, more 3.5-inch mechanisms were being announced or released by several manufacturers, including Fujitsu, Hewlett-Packard, Hitachi, IBM, Maxtor, and Quantum. We'll keep you posted.

— Mark Frost and the MacUser Labs staff

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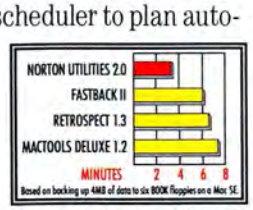

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Supercharging the SCSI Bus: SCSI-2 Cards

Give your Mac a faster data path with one of these four SCSI-2 cards.

BY KELLI WISETH AND THE MACUSER LABS STAFF

You'll notice an underlying theme for this month's lab reports — speed. All the drives and mechanisms discussed in this Buyer's Guide, from historically slow magneto-optical drives to gigabyte hard-disk mechanisms, access and transfer data faster than ever. Manufacturers of hard-disk mechanisms especially have implemented a variety of performance-enhancing techniques, including smarter caches and more-efficient formatting schemes, in order to squeeze data into and out of their drives as quickly as possible (see "3.5-Inch Gigabyte Hard-Disk Mechanisms," elsewhere in this Buyer's Guide).

So how come you still find time to brew a pot of coffee while a 50-megabyte Photoshop image is opening on your Mac IIfx, despite its newly attached ultra-high-speed drive? Because although hard-disk-drive *data-transfer* speeds — the rate at which data is written to and read from the storage medium — have improved over the years, your Mac's SCSI (Small Computer System Interface) bus still moves data from a drive into your Mac at the same tired rate it always did. On most Macs, that's about 2 megabytes per second.

The Mac's built-in SCSI *controller chip,* which handles most of the transfer chores between a Mac and a hard drive, is based on the original ANSI-standard SCSI specification, which provides for a maximum data-transfer rate of about 5 megabytes per second (see the "SCSI Evolution" sidebar). However, Apple's implementation of SCSI is slightly different from the original SCSI standard. Apple adopted only a subset of the full industry-standard specification, and unfortunately, its deviations from the standard impose a maximum speed limit on the Mac's SCSI bus. This maximum rate can range from 1.5 to 3.2 megabytes per second (see Table 1). Most hard

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SCSI Evolution

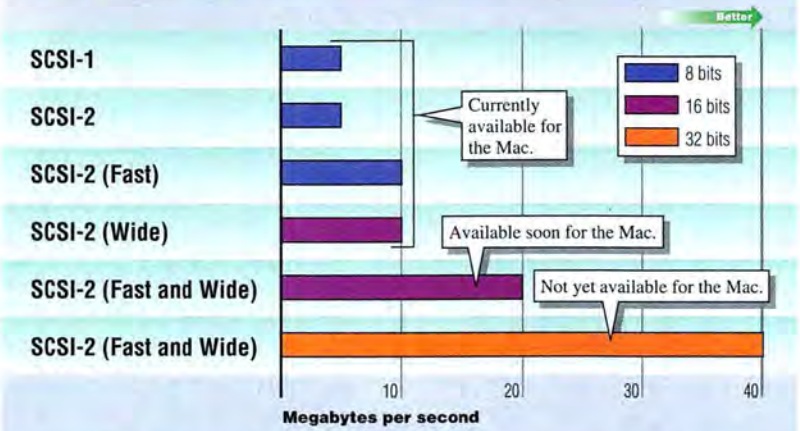


Figure A: Shown here are SCSI-1 and SCSI-2 transfer rates as specified by ANSI.

The original SCSI (Small Computer System Interface) specification, now known as SCSI-1, was approved by ANSI (American National Standards Institute) in 1986 and provides guidelines for computer-and-peripheral communications.

The SCSI specification covers many things, including how fast data transfers between a device and a host computer can occur. The SCSI standard includes a command set that a *host*, such as a Mac, can use to communicate with a hard drive or other devices on the SCSI bus. Nonetheless, the original standard provided a lot of latitude for vendor-unique commands that needed to be handled by proprietary and sometimes incompatible device drivers — thus somewhat defeating the original intent of the SCSI specification.

The original command set, known as the CCS (Common Command Set), has now been codified and subsumed by the recently approved SCSI-2 specification. In addition to mandating that the de facto CCS be used by all SCSI-2 devices, the standard also provides specifications for faster data-transfer rates through the Fast and Wide options. SCSI-1 and SCSI-2 each transfer data in parallel, 8 bits at a time, and can achieve maximum transfer rates of 5 megabytes per second. The optional Fast-SCSI-2 mode, however, can transfer data at as much as 10 megabytes per second. Wide SCSI-2 uses a wider data path — 16 bits compared with the normal 8 bits — to achieve the same 10 megabytes per second in the same amount of time. A third option, which combines both the Fast and Wide options, can theoretically achieve transfer speeds as high as 20 megabytes per second. Making the data path 32 bits wide would theoretically provide transfer rates of a whopping 40 megabytes per second, but issues involving multiple cabling schemes make this a distant-future improvement for the Mac.

drives available today conform to a newer version of the SCSI standard, SCSI-2, and they can transfer data faster than the Mac's built-in SCSI bus can handle. For example, the Seagate Elite-1 mechanism we used in our tests can sustain a data-transfer rate of 3.3 megabytes per second. What your Mac needs is a faster data path that can keep up with a fast hard drive.

For this report, we tested four SCSI-2 cards in the Mac IIfx. The ATTO SiliconExpress II, the MicroNet NuPORT-II, and the PLI QuickSCSI cards are NuBus cards designed for NuBus Macs; the Storage Dimensions Data Cannon PDS/FX card is designed specifically for the Mac IIfx's PDS (processor-direct slot).

Some vendors have tried unsuccessfully to boost the speed of the Mac's existing SCSI bus (see "SCSI Accelerators," March '90, page 175). But the SCSI cards in this report leave your existing built-in SCSI bus alone and add a second, faster SCSI bus that works through your Mac's NuBus or PDS: The built-in SCSI bus remains intact to handle slow-performing peripherals such as scanners and tape drives (see the "How It Works: SCSI-2 Cards" sidebar).

The MicroNet NuPORT-II and the Storage Dimensions Data Cannon PDS/FX cards are sold with high-speed large-capacity hard drives from the respective vendor's product line; the ATTO SiliconExpress II and the PLI QuickSCSI cards are sold independently of any drive, so you can match one of these to a fast drive from any number of vendors. We ran the same suite of real-world benchmark tests used in this month's other lab reports to isolate some of the variables that affect overall performance.

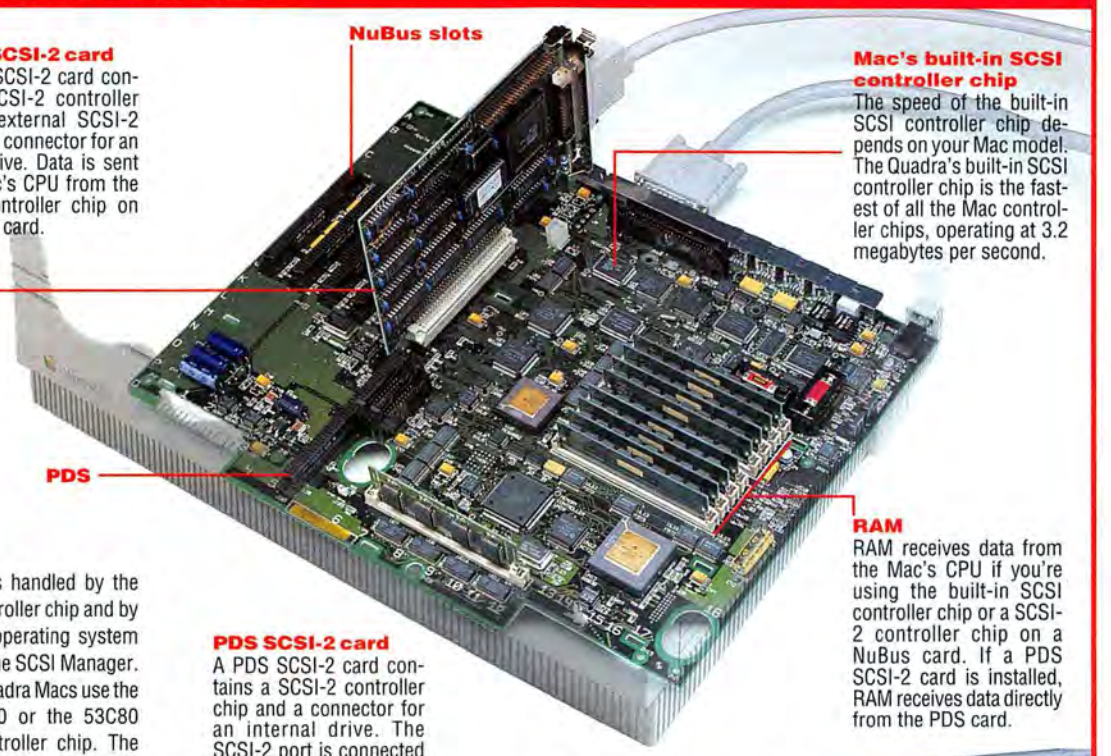
Performance Issues

In simple terms, all the components that make up the Mac's data pipeline, beginning with the hard drive, through the SCSI bus, to the Mac's CPU, handle data transfer at different speeds. Nonetheless, the net result of all these variables is easy to figure: Nothing can travel faster than the slowest device in the pipeline lets it (see Figure 1). For example, NuBus speed is about 4.4 megabytes per second, so regardless of how fast a hard-disk drive can find data and read it from the disk, if it travels on the NuBus, it can't travel faster than 4.4 megabytes per second at any time after that. Likewise, if a relatively slow hard-drive mechanism, such as the Quantum LPS 80, transfers data into a 5-megabyte-per-second-capable pipeline at 1.25 megabytes per second, 1.25 megabytes per second is as fast as the data is going to get to the Mac.

In addition, hard-drive speed — the speed at which data enters the pipeline — itself depends on a combination of factors, including a drive's access time, burst rate, and sustained data-transfer rate. The access time is simply how long it takes the drive to find data on the disk. Data is then transferred into the SCSI bus at the *sustained* data-transfer rate. Data is

How It Works: SCSI-2 Cards

NuBus SCSI-2 card
A NuBus SCSI-2 card contains a SCSI-2 controller chip, an external SCSI-2 port, and a connector for an internal drive. Data is sent to the Mac's CPU from the SCSI-2 controller chip on the NuBus card.



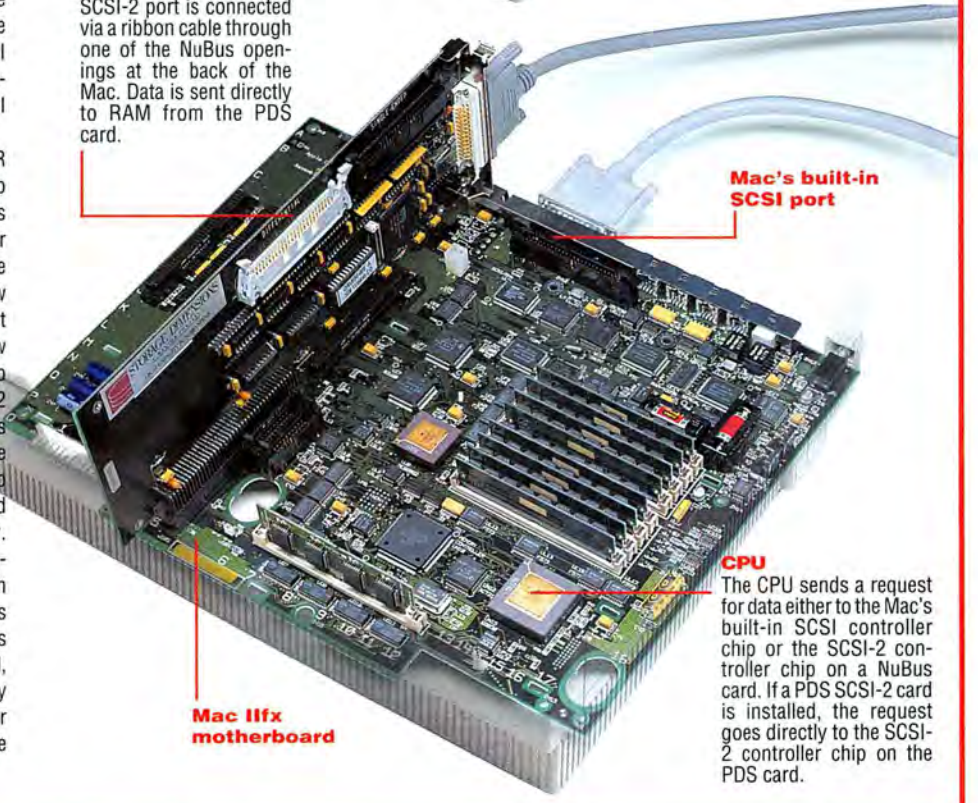
Mac's built-in SCSI controller chip
The speed of the built-in SCSI controller chip depends on your Mac model. The Quadra's built-in SCSI controller chip is the fastest of all the Mac controller chips, operating at 3.2 megabytes per second.

RAM
RAM receives data from the Mac's CPU if you're using the built-in SCSI controller chip or a SCSI-2 controller chip on a NuBus card. If a PDS SCSI-2 card is installed, RAM receives data directly from the PDS card.

SCSI is handled by the SCSI controller chip and by the Mac operating system through the SCSI Manager. All pre-Quadra Macs use the NCR 5380 or the 53C80 SCSI controller chip. The Quadras sport the more powerful NCR 53C90 SCSI chip, but they are still outpaced by the fastest SCSI drives available today.

Unfortunately, each NCR controller chip has a top speed of about 2 megabytes per second — much slower than that of many of the speedier hard drives now on the market. You can get around the Mac's slow built-in SCSI controller chip by installing a SCSI-2 NuBus or PDS card. Data is transferred from the drive to the SCSI-2 controller chip on the card and then moved to your Mac's memory. When matched with an ultra-high-speed drive, such as Newer Technology's Dart-II drive, a PDS card is faster than a NuBus card, because it works directly with the Mac's RAM rather than going through the Mac's CPU.

PDS SCSI-2 card
A PDS SCSI-2 card contains a SCSI-2 controller chip and a connector for an internal drive. The SCSI-2 port is connected via a ribbon cable through one of the NuBus openings at the back of the Mac. Data is sent directly to RAM from the PDS card.



CPU
The CPU sends a request for data either to the Mac's built-in SCSI controller chip or the SCSI-2 controller chip on a NuBus card. If a PDS SCSI-2 card is installed, the request goes directly to the SCSI-2 controller chip on the PDS card.

On the Horizon

The release of NCR's latest SCSI controller chip, the 53C720, has produced a flood of new SCSI-2 cards that implement the 16-bit Fast and Wide options of SCSI-2.

DayStar Digital's SCSI PowerCard is a plug-and-play product with installation software written into its programmable ROM chips, thus reducing floppy-disk software to a control panel. The SCSI PowerCard for NuBus Macintoshes costs $1,000; current PowerCard owners can upgrade without charge. DayStar Digital, 5556 Atlanta Highway, Flowery Branch, GA 30542; 404-967-2077.

FWB's new JackHammer SCSI card has a built-in 128K RAM buffer. Generally, a drive sends only as much data as your Mac can handle. When the Mac is ready for more, it signals the drive, which sends the next chunk of data. With the JackHammer, the drive sends a continuous stream of data to the buffer on the card. The buffer then sends the Mac as much data as it can handle while the drive continues its operation uninterrupted, so the drive transfers data faster. The JackHammer, designed for use with any hard drive, costs $999; it costs $799 if purchased with an FWB drive. FWB, Inc., 2040 Polk Street, San Francisco, CA 94109; 415-474-8055.

Loviél has announced two SCSI-2 PDS cards based on the 53C720: the FXSCSI20, for the Mac IIfx, and the QuadSCSI20, for the Quadras. Although PDS cards are unable to reach their publicized data-transfer speeds of 20 megabytes per second, they



do take advantage of the PDS slot, which allows for rates as high as 7 megabytes per second. The FXSCSI20 has a 20-megahertz input/output processor, and the QuadSCSI20 has a 25-megahertz input/output processor. The cards based on the 53C720 are priced at $1,099 each. An earlier version of the FXSCSI card, the FXSCSI10, is also available for the Mac IIfx. This earlier version uses the 53C710 SCSI-2 chip and costs $999. Loviél Computer Corp., 5174 W. 76th Street, Edina, MN 55439; 612-835-3553.

Storage Dimensions has announced a Data Cannon PDS/Quadra card for the Quadras. The card is available only for owners of Storage Dimensions' MacinStor SCSI-2 drives. Software bundled with the new Data Cannon PDS/Quadra card supports mirroring, spanning, and data striping. The card lists for $1,099. Storage Dimensions, 1656 McCarthy Blvd., Milpitas, CA 95035; 408-954-0710.

— Roman Victor Loyola

often transferred through a cache, and if the data is read from the cache, the mechanism transfers it at the *burst* rate. The specifications that vendors cite usually refer in some way to the burst and sustained rates, with the burst rate being the higher of the two.

But perhaps the most important variable is the way in which different applications interact differently with a hard drive, achieving different overall speeds. Microsoft Word, for example, pulls most of the data into the Mac's RAM, so faster disk access — and hence the ability to get more data into the SCSI bus faster — can't do much to speed up your work with Word. On the other hand, because Photoshop and QuarkXPress are transfer-intensive applications, they benefit from increased throughput.

The applications-based approach to our tests was designed to highlight the differences among applications and how they interact with the hard drive. In general, a SCSI-2 card coupled with a fast drive can improve performance by 75 to 250 percent, depending on the application (see Figure 2).

Simple Setup

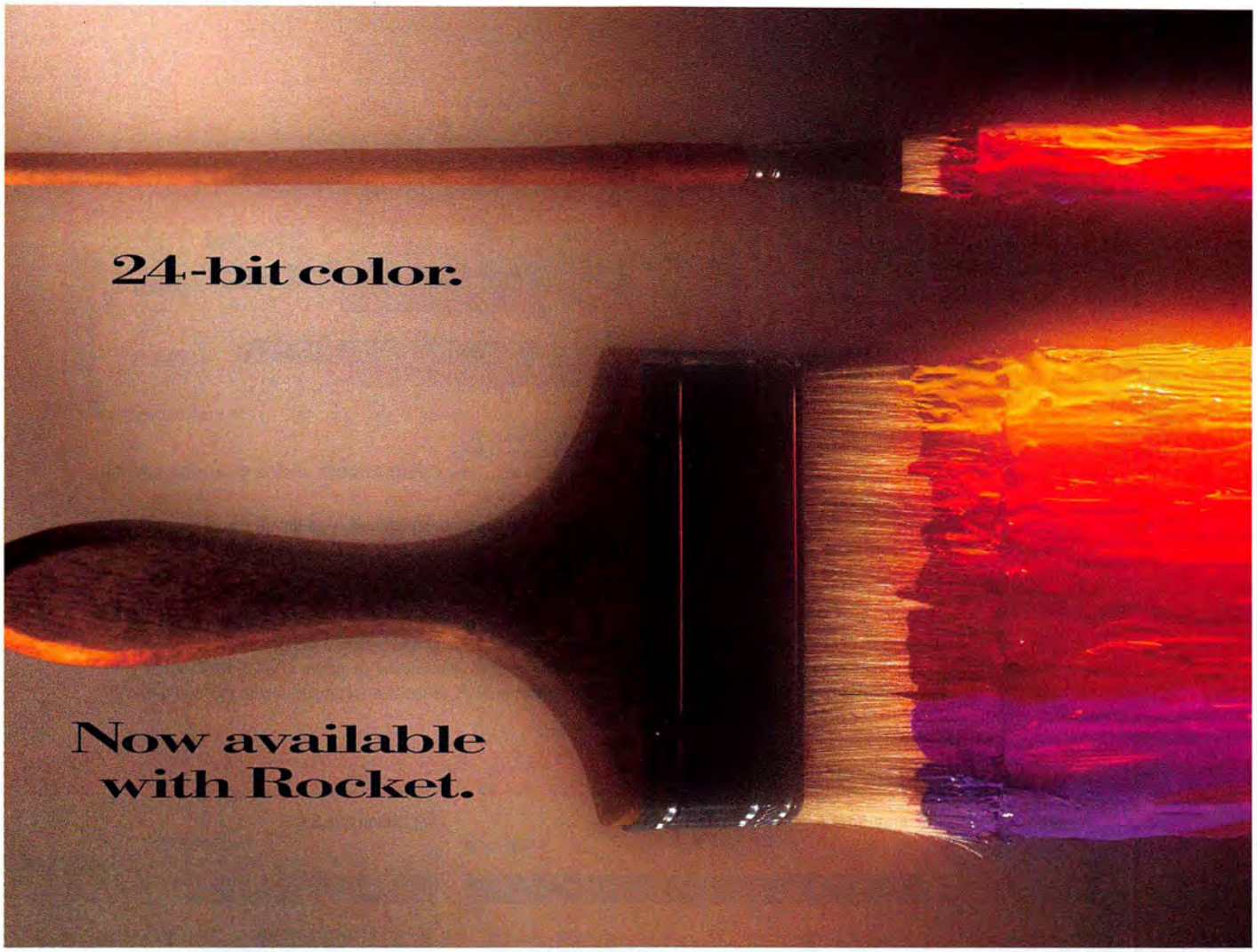
You don't need to be a systems engineer to install one of these SCSI cards in your Mac, but you do need to use the same care as you would in installing any other NuBus or PDS card: Shut down your Mac and all peripherals, and be sure to ground yourself by touching something metal, such as the power supply, before installing the card.

The NuBus cards fit snugly into any available NuBus slots in your Macintosh. The Storage Dimensions Data Cannon PDS/FX card, on the other hand, is designed to work only with the Mac IIfx's PDS. And you nevertheless lose the use of one of your Macintosh IIfx's NuBus slots, because the PDS in the IIfx is directly in line with the rightmost NuBus slot and the SCSI connector protrudes

Table 1: Should You Buy a SCSI-2 Card?

● = yes ○ = no ◐ = maybe	Sustained Data-Transfer Rate			
Built-in SCSI transfer rate	1.25 MB/sec (Quantum LPS 80)	2.2 MB/sec (Quantum LPS 240)	3.3 MB/sec (Seagate Elite-1)	12 MB/sec (Newer Technology Dart-II)
1.5 MB/sec (Mac II)	○	●	●	●
2.0 MB/sec (Mac IIci)	○	◐	●	●
1.5 MB/sec (Mac IIfx)	○	●	●	●
3.2 MB/sec (Mac Quadra)	○	○	○	●

Table 1: There's no point in getting a SCSI card unless your hard drive is faster than your Mac's built-in SCSI bus. Here are some example transfer rates, from the lowest to the highest possible, of various drives and of the Macs.



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through the back of the Macintosh.

You can connect your Mac's internal hard drive to the SCSI-2 card rather than to the built-in bus, by using the existing 50-pin SCSI ribbon cable. Depending both on the number of internal and external hard drives that will share the SCSI bus and the type of Mac you have, you may or may not have to futz with the termination of the card, the internal hard drive, or an external hard drive. All the cards' manuals discuss the details of termination clearly and in depth.

When you're certain that your new SCSI bus and all devices, internal as well as external, have distinct SCSI-ID numbers and are properly terminated, you can install any necessary system extensions or control-panel software, although you generally don't

Figure 1: SCSI-1 Versus SCSI-2

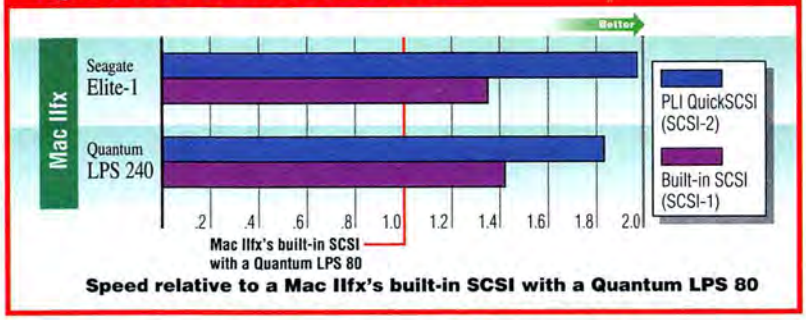


Figure 1: Just as any system is only as strong as the weakest link in the chain, data transfer between a Mac and a hard-disk drive can occur only as fast as the slowest device in the pipeline operates. The Mac IIfx's built-in SCSI bus can transfer data at about 1.5 megabytes per second, but the Seagate Elite-1 transfers data at about 3.3 megabytes per second — the Mac's built-in SCSI can't keep pace. Conversely, the increased throughput of the SCSI-2-based PLI QuickSCSI card is lost when the card is matched with a relatively slow drive mechanism, such as the 1.25-megabyte-per-second Quantum LPS 80, the internal mechanism shipped in many Mac models. Results are compared with those of a Mac IIfx with a Quantum LPS 80.

Figure 2: Speed of SCSI-2 Cards

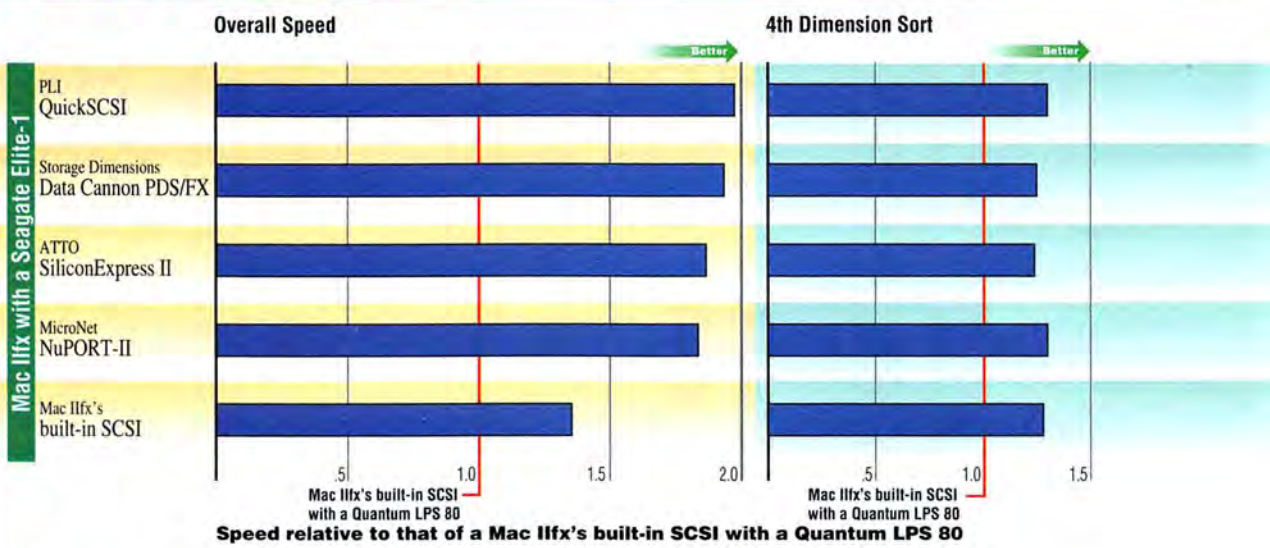


Figure 2: We ran the same set of benchmark tests as we used for the other lab reports in this Buyer's Guide: We sorted a 2,000-record 4th Dimension database; copied a 13-megabyte file, using DiskTop; duplicated a 13-megabyte file with the Finder; and opened, rotated, and saved a 5.4-megabyte Photoshop image. Our test platform was a Mac IIfx with a Seagate Elite-1 drive mechanism. We compared all our results with those of a Mac IIfx with a Quantum LPS 80.

Overall Speed:

Different applications interact with the hard-disk drive in different ways: Some constantly move small-sized blocks of data between the Mac and the drive, whereas others work with large-sized blocks or access the drive less frequently. Thus you'll gain greater benefit from a SCSI-2 card only when you use certain applications.

4th Dimension Sort:

Sorting a 4th Dimension database is a disk-bound task that taxes a drive's access speed more than anything else. As the records in the database are being reorganized, the heads skip all around the drive, reading and writing data. Because that data doesn't travel back across the SCSI bus to your Mac, a faster SCSI port has only a negligible effect on performance.

DiskTop Copy:

DiskTop copies data by moving large chunks of data through the SCSI port, thus taking advantage of high sustained data-transfer rates. In this test, the SCSI-2 card kept pace with the sustained data-

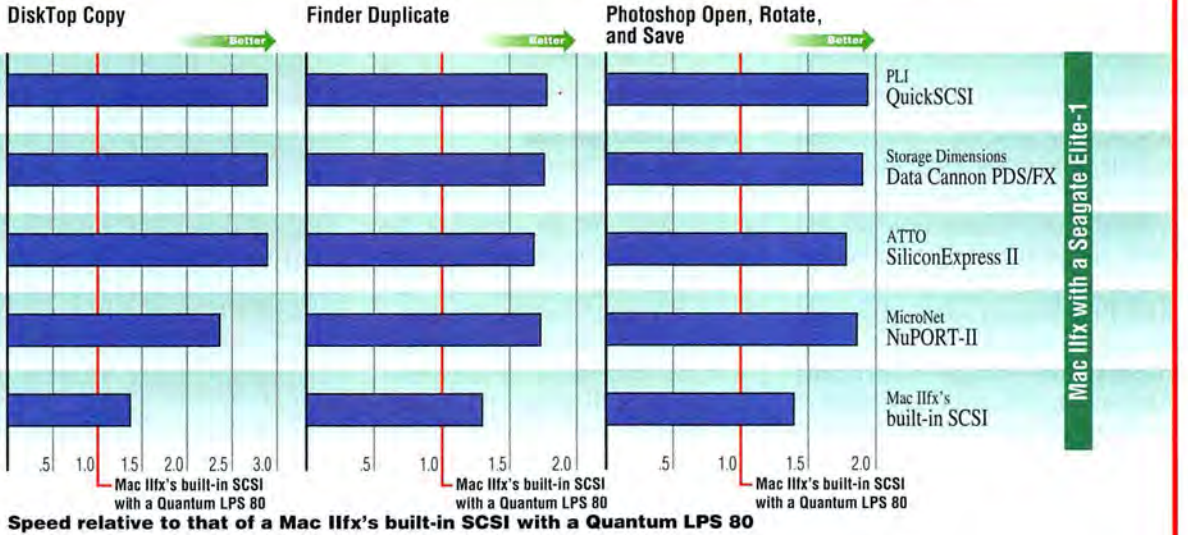
need to install any software to use the cards. The ATTO SiliconExpress II card contains its *driver* — the software that enables the Mac and any attached peripherals to communicate over the bus — in ROM on the card, and the MicroNet NuPORT-II card loads its drivers into memory from ROM on the card. The Storage Dimensions Data Cannon PDS/FX card works only with the company's own MacinStor drives, which are shipped with the appropriate drivers. The PLI QuickSCSI card requires that you install the QuickSCSI system extension for the card to work.

Of Formatters and Features

Both MicroNet and Storage Dimensions preformat the drives shipped with their respective cards, but you can use the formatting software included with any of these cards to reformat drives or make use of additional features. *Fault-tolerant* features such as mirroring and cloning provide additional data integrity. Mirroring, for example, maintains a continuous copy of one hard disk on a second hard disk and is an effective continuous-backup strategy that is often used for network file servers. (Of course, you need a second hard drive to use this feature.) Software provided with each of the cards lets you create mirrored pairs of drives.

In addition to mirroring, the MacinStor Installer software that comes with the Storage Dimensions Data Cannon PDS/FX card lets you *span* multiple hard drives connected to the card — two or more drives become a single logical drive, giving you more continuous storage space. But because the MicroNet NuPORT-II card works only with MicroNet hard drives and the Storage Dimensions Data Cannon PDS/FX card works only with hard drives from Storage Dimensions, you cannot span other drives you may have. The software that ships with the ATTO SiliconExpress II and MicroNet NuPORT-II cards provides a performance-enhancing feature called *overlapped seeks*, which reduces seek time by combining two hard drives into one logical volume. However, recovering data from a crashed drive that uses this feature is extremely difficult, if not impossible.

Features such as these are often found in third-party software, but these vendor-provided options are designed



Speed relative to that of a Mac IIfx's built-in SCSI with a Quantum LPS 80

transfer rate of the hard drive, thus providing faster throughput. All the SCSI-2 cards were 2.5 to 3 times as fast with a fast drive mechanism as the Macintosh IIfx's built-in SCSI bus was with a slow drive mechanism.

Finder Duplicate:

Unlike DiskTop, the Mac's Finder reads and writes data in small pieces, so it cannot take advantage of increased throughput between the hard drive and the Mac. Because many Mac applications also read and write data in this fashion, these results hint at the expected performance improvement in many situations. The cards showed only about a 33-percent improvement over the Mac's built-in SCSI with a comparable drive in this test.

Photoshop Open, Rotate, and Save:

Because it uses the hard drive for virtual memory, Photoshop exercises all the components of your storage system. Photoshop not only uses the hard drive for RAM but it also reads and writes data in small-sized blocks and maintains two additional copies of the working image — an undo copy and an original copy. When we opened, rotated, and saved the 5.4-megabyte Photoshop test file, the Mac was juggling at least 16.2-megabytes' worth of data between its RAM and the hard drive, giving the hard drive, the Mac's CPU, and the SCSI bus a real workout. Performance with a fast hard-drive mechanism and a SCSI-2 card was in general close to twice as fast as with the built-in SCSI and a slow drive mechanism.

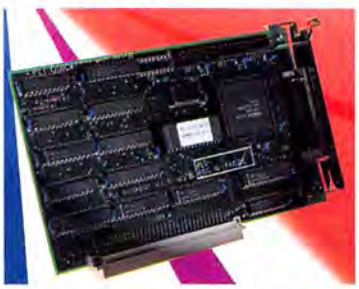
The Bottom Line

Hard-disk drives have gotten faster and CPUs have gotten leaner and meaner, but the Mac's built-in SCSI controller chip still limps along at a fairly modest clip. There's no getting around it, you must go around it: A NuBus- or PDS-based SCSI-2 card can provide your Mac with a second, faster data path that can better keep pace with today's SCSI-2 hard drives. But remember that your hard drive should be capable of a sustained throughput rate of about 2 megabytes per second to take advantage of a faster SCSI bus.

For those whose drives meet this criterion, the **PLI QuickSCSI** card ($399 list, $325 street) will stand them in good stead. It's not only the least expensive card by a long shot but it also gave the best results in our tests.

That's not to knock the other cards, however. The **MicroNet NuPORT-II** card ($600 list, $450 street) is also relatively inexpensive and is sold as part of a complete hard-disk storage system. MicroNet's formatting utility lets you enable overlapped seeks between two drives for improved performance. If you've got a MicroNet drive, this is the card you need to get if you want to squeeze out better SCSI performance.

The **ATTO SiliconExpress II** card ($1,295 direct) and the **Storage Dimensions Data Cannon PDS/FX** card ($859 list, $550 street) are built for the future, when the Mac will be able to take advantage of multitasking. These bus-master cards also have coprocessors on board, ready to absorb many of the processing tasks that bog down the Mac's CPU during input/output operations. AppleShare 3.0 is one Mac application that can take advantage of bus-master features today.



to work with the SCSI-2 cards, so you don't have to worry about incompatibility problems that might arise.

Some of the differences among the cards are hardware-based. For example, the more expensive cards — the ATTO SiliconExpress II and the Storage Dimensions Data Cannon PDS/FX cards — are *bus-master* cards that also contain *coprocessors:* Many of the input/output chores typically handled by the Mac's CPU are relegated to these coprocessors for more-efficient handling, much as is the case with a video coprocessor. The Mac's CPU is then free for other tasks. A bus-master card can send data directly to RAM without routing it through the CPU — but only in a multitasking operating system, such as A/UX, or if an application is written to take advantage of the feature, as is AppleShare 3.0, for example. We expect to see better performance when Apple releases an operating system that can take advantage of this feature of bus-master cards.

Hop on the Right Bus

The Mac's SCSI port lets you connect hard drives or other peripherals to your Mac, but the speed of the built-in SCSI controller chip is far slower than that of today's fast hard drives. If you have a Mac IIfx and a fast hard drive — any drive that outpaces the Mac IIfx's 1.5-megabyte-per-second SCSI port — you may well benefit from a second, faster NuBus- or PDS-based SCSI bus.

The PLI QuickSCSI is the least expensive card we looked at, and it gave the best performance. Two of the cards — the ATTO SiliconExpress II and the Storage Dimensions Data Cannon PDS/FX — are bus-master cards, which will no doubt show their benefits more when the Mac operating system makes use of multitasking. Such cards can help today, though — for example, when AppleShare 3.0 file-server software is being used in networked environments.

Kelli Wiseth is a *MacUser* senior editor.

Table 2 Criteria

List price — The manufacturer's suggested retail price.
Street price — The average price (without options) as charged by a sample of U.S. dealers in February 1992.
Slot type — The type of expansion-bus slot, NuBus or PDS, into which the card is designed to fit.
Bus master — Is the card a bus-master card, designed to send data directly to RAM without using the Macintosh's microprocessor?
SCSI-2 controller chip — The SCSI controller chip used on the SCSI-2 card.
On-board coprocessor — The coprocessor to which the card can offload certain processing tasks.
Sustained data-transfer rate — The rate at which large data blocks are transferred from the drive, in megabytes per second.
Burst rate — The rate at which data is read from the cache, in megabytes per second.
Internal SCSI connector — The type of SCSI port provided on the card for connection to an internal hard drive.
External SCSI connector — The type of SCSI port provided on the card for connection to external hard drives and other supported devices.
Formatting software — The formatting software shipped with the card.
Additional software — Additional utility software, system extensions, or control panels shipped with the card.
Maximum partitions — The maximum number of partitions into which you can format a hard disk, using the formatting software provided.
Password-protected partitions — Can you use the formatting software to password-protect partitions?
Mirroring — Does the formatting software let you write data to two drives automatically?
Cloning/copying — Does the formatting software let you duplicate the contents of one hard disk onto another hard disk in one step?
Spanning — Can the formatting software combine two hard-disk drives into one logical unit?
Overlapped seeks — Does the formatting software provide drivers for searching the contents of two disks simultaneously, thus increasing performance?

Table 2: Features of SCSI-2 Cards

● = yes ○ = no	ATTO SiliconExpress II ↕↕↕½	MicroNet NuPORT-II ↕↕↕½	PLI QuickSCSI ↕↕↕↕	Storage Dimensions Data Cannon PDS/FX ↕↕↕½
List price	$1,295	$600	$399	$859
Street price	$1,295	$450	$325	$550
Pros	Bus-master card. Comes with anti-static wrist strap.	Disk-array support.	Least expensive. Fastest NuBus card. Toll-free tech support. Comes with anti-static wrist strap.	Bus-master card.
Cons	Most expensive. No toll-free tech support.	No toll-free tech support.	Cannot use the Mac's Startup control panel.	No toll-free tech support.
Hardware features				
Slot type	NuBus	NuBus	NuBus	PDS
Bus master	yes	no	no	yes
SCSI-2 controller chip	Emulex	53C90A	53C90	53C710
On-board coprocessor	68000	none	none (on-board DMA)	53C710
Sustained data-transfer rate*	10 MB/sec	4.4 MB/sec	4.4 MB/sec	10 MB/sec
Burst rate*	10 MB/sec	6 MB/sec	6 MB/sec	10 MB/sec
Internal SCSI connector	50-pin ribbon	50-pin ribbon	50-pin ribbon	50-pin ribbon
External SCSI connector	25-pin	50-pin	50-pin	25-pin
Devices supported				
Hard-disk drives	any	MicroNet	any	Storage Dimensions
SyQuest drives	●	○	●	○
Bernoulli drives	○	○	●	○
Tape drives	○	○	○	○
Erasable optical drives	○	○	●	●
Scanners	○	○	○	○
Software features				
Formatting software	SCSI Director	MicroNet SCSI Utility 5.0	QuickSCSI Formatter	MacinStor Installer 3.1
Additional software	SExpress control panel, ExpressMirror	MicroNet QuikMount 1.0	QuickSCSI extension, QuickSCSI Manager	MacinStor control panel
Maximum partitions	unlimited	36	6	4†
Password-protected partitions	○	●	○	●
Mirroring§	●	●	●	●
Cloning/copying§	●	●	●	●
Spanning§	○	●	○	●
Overlapped seeks§	●	●	○	○
Other features				
Warranty	1 year	1 year	5 years	1 year
Extended warranty	$130/year	$129/year	none	none
Money-back guarantee	15 days	none	30 days	none
Toll-free tech support	no	no	yes	no
Company	ATTO Technology, Inc. 1576 Sweet Home Rd. Amherst, NY 14228 716-688-4259 716-636-3630 (fax)	MicroNet Technology, Inc. 20 Mason Irvine, CA 92718 714-837-6033 714-837-1164 (fax)	Peripheral Land, Inc. 47421 Bayside Pkwy. Fremont, CA 94538 800-288-8754 510-657-2211 510-683-9713 (fax)	Storage Dimensions, Inc. 1656 McCarthy Blvd. Milpitas, CA 95035 408-954-0710 408-944-1200 (fax)

*Asynchronous, the SCSI mode used by the Mac.

†Partitions of equal size.

§Requires two hard drives.

MacWeek & MacUser's 1991 Utility Product of the Year!



Now Utilities

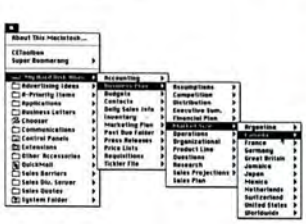
The Ultimate System Enhancement Collection

What did it take to get the editors at *MacWeek* and *MacUser* to agree on the best Macintosh utility product?

Unprecedented performance, compatibility, and value. In this case, a collection of 10 utilities that does for System 7 what products like SUM and Norton do for hard disks — only more so. As *MacUser* put it, "Now Utilities will make your Macintosh faster, easier, and more fun to use." For example:

- ***StartUp Manager***™ provides complete extension management
- ***Super Boomerang***™ finds files and folders instantly
- ***WYSIWYG Menus***™ groups fonts in their own typefaces
- ***NowMenus***™ makes the Apple Menu hierarchical
- ***AlarmsClock***™ displays the time & reminders in the menubar
- ***NowSave***™ automatically saves files to prevent data loss
- ***Screen Locker***™ keeps confidential information confidential
- ***MultiMaster***™ launches applications and files
- ***Profiler***™ analyzes system configurations
- ***DeskPicture***™ puts color and B&W pictures on the Desktop

In fact, every utility in the collection is the best of its kind. Every utility in the collection is also designed, tested, and guaranteed to work together — and with anything you may have...even System 6. No wonder *MacUser* gave it a perfect five mouse rating and called it, "a must-have for experienced users and novices alike."

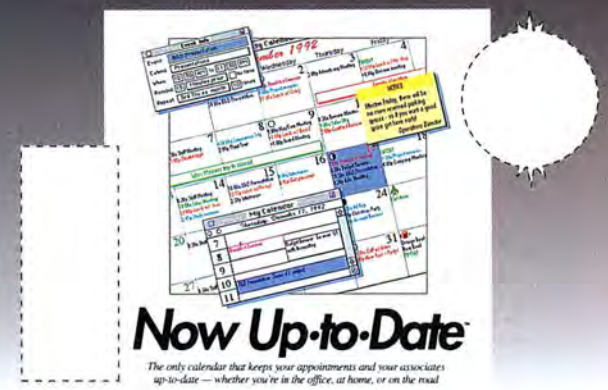


NowMenus saves you a lot of mousing around by creating submenus up to 5 levels deep for anything you put in your Apple Menu items folder — even aliases and other folders. It also pops up the menubar wherever you click your mouse



Super Boomerang lists your most frequently used files and folders in all Open and Save dialog boxes and in the Apple menu. It also lets you find files by name or content...even if they've been compressed (a file name search on a 100MB hard disk can take only 3 seconds — without requiring an index)

MacWeek & MacUser's 1992 Network Product of the Year?



Now Up-to-Date

The only calendar that keeps your appointments and your associates up-to-date — whether you're in the office, at home, or on the road

What will it take to get the editors at *MacWeek* and *MacUser* to agree on the best Macintosh network product?

Perhaps Now Up-to-Date™: the only Macintosh application that keeps your appointments and your associates up-to-date — whether you're in the office, at home, or on the road.

Organize Your Appointments Now Up-to-Date can schedule a meeting to occur at 9:00 AM on the first Tuesday of every month and have it automatically appear on your associates' calendars. Scheduled events can be private, shared, or restricted (i.e., only available to people with the correct password.)

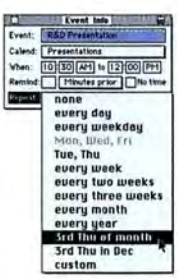
Remember Your Meetings Now Up-to-Date keeps track of all of your meetings and appointments, so you don't have to. It can also provide advance warning of upcoming events to ensure everyone shows up on time.

Mobilize Your Office Now Up-to-Date's versatile printing options include support for all major appointment books, so you can take your calendar on the road. If you own a PowerBook you'll appreciate the fact that Now Up-to-Date doesn't require you to be connected to a network to see your schedule. For that matter, you don't even need to own a network: Now Up-to-Date makes a great single user product, too.

Isn't it time you got up-to-date?



Now Up-to-Date's unique 'Public Calendars' coordinate your schedule with your associates' automatically, so your left hand knows what your right is doing



Now Up-to-Date can repeat events (and their reminders) with whatever frequency you may desire

With all this attention from the press it's not surprising that Now Utilities is already one of the best-selling products on the Macintosh. Now Up-to-Date looks to be just as popular. Call Now at **1-800-237-3611** to learn more about both of these great products, and how they can help you get more out of your Macintosh.

Now Software

Now Software, Inc. 319 S.W. Washington Street, 11th Floor Portland, Oregon 97204 Telephone: (503) 274-2800 Toll-Free: (800) 237-3611 Facsimile: (503) 274-0670

CIRCLE 177 ON READER SERVICE CARD.

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Anthem Technology Systems
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San Jose, CA 95131
800-359-3580
408-441-7177

APS (Alliance Peripheral Systems)
2900 S. 291 Highway
Independence, MO 64057
800-233-7550
816-373-5800

ATTO Technology, Inc.
1576 Sweet Home Road
Amherst, NY 14228
716-688-4259

Blackhole Technology, Inc.
225 East Street
Winchester, MA 01890
800-227-1688
617-721-7690

Bytewide
5255 Fairway Avenue
Lachine, Quebec H8T 1C1
Canada
800-465-5241
514-636-5938

Casa Blanca Works, Inc.
148 Bon Air Center
Greenbrae, CA 94904
415-461-2227

CD Solutions, Inc.
219 Majorca Drive
San Ramon, CA 94583
510-735-1601

CD Technology
766 San Aleso Avenue
Sunnyvale, CA 94086
408-752-8500

ClubMac
3 Musick
Irvine, CA 92718
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CMS Enhancements
2722 Michelson Drive
Irvine, CA 92715
714-222-6000

Computer Upgrade Corp.
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Suite A
Anaheim, CA 92806
800-874-8807
714-630-3457

Contemporary Cybernetics Group
11846 Rock Landing
Newport News, VA 23606
804-873-9000

Core International
7171 N. Federal Highway
Boca Raton, FL 33487
800-688-9910
407-997-6055

Corel Systems Corp.
1600 Carling Avenue
Suite190
Ottawa, Ontario K1Z 8R7
Canada
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716-423-8200

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Worthington, OH 43085
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614-433-0045

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307-789-0582

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404-967-2077

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416-636-3000

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307-789-3830

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800-628-3837
510-498-1111

ETC (Exportech Training Corp.)
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Suite 300
Tampa, FL 33634
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813-884-2863

Flexsys Corp.
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800-533-7756
508-465-6060

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2040 Polk Street
Suite 215
San Francisco, CA 94109
415-474-8055

GCC Technologies
580 Winter Street
Waltham, MA 02154
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617-890-0880

GigaTrend
2234 Rutherford Road
Carlsbad, CA 92008
619-931-9122

Golden Triangle Computers, Inc.
4849 Ronson Court
San Diego, CA 92111
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619-279-2100

HDI (Hard Drives International)
1912 W. 4th Street
Tempe, AZ 85281
800-488-0001
602-350-1128

Hewlett-Packard Co.
Network Server Division
11413 Chinben Blvd.
Building 3 Lower
Boise, ID 83714
208-323-6000

IDE (International Data Engineering), Inc.
7727 Washington Avenue S.
Minneapolis, MN 55439
612-946-4100

Introl Corp.
2817 Anthony Lane S.
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612-788-9391

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Roy, UT 84067
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801-778-1000

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The Penthouse
535 Ramona Street
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415-322-5387

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Portland, OR 97217
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512-472-8881

MacTel Technology
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Austin, TX 78705
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512-451-2600

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Boulder, CO 80301
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313-761-2783

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714-837-6033

Microtech International, Inc.
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203-468-6223

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612-633-4450

Newer Technology
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408-954-8686

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Westlake Village, CA 91361
818-707-9900

OAI (Optical Access International)
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Wolburn, MA 01801
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617-937-3910

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408-374-8300

Omnishore Electronics
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702-687-2802

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408-376-3511

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Irvine, CA 92714
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Panasonic Office Automation Group
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201-348-7000

PCPC (Personal Computer Peripheral Corp.)
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813-884-3092

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Conshohocken, PA 19428
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714-724-1505

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Bothel, WA 98011
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512-346-8360

Third Wave Computing, Inc.
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512-832-8282

TMS Peripherals
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800-275-4867
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800-422-1139
508-480-9042

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5401 E. La Palma Avenue
Anaheim, CA 92807
714-693-7707

Tulin Technology
2156H O'Toole Avenue
San Jose, CA 95131
408-432-9025

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Anaheim, CA 92807
800-447-6350
714-779-7478

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800-741-3668
407-243-3668

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408-437-1000

Wholesale 54
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In rewritable optical media, driving at the wrong speed can be hazardous to your priceless data.

But when you drive a Sony 3.5 inch rewritable optical disk, safety prevails at every turn. Because Sony disks are precisely tuned to perform across all 1800–3600 rpm ISO standard drives.

The fact is, users should pay as much attention to their disk's performance as to the drive's for a very simple reason. Multiple technological differences exist, affecting the way different media behave in various rpm drives.

Which means the media that you select can have a direct impact on how well your drive performs, as well as the reliability of your data.

So whatever speed you're driving, be sure you always fill up on premium. Sony 3.5 inch rewritable optical media.

SONY

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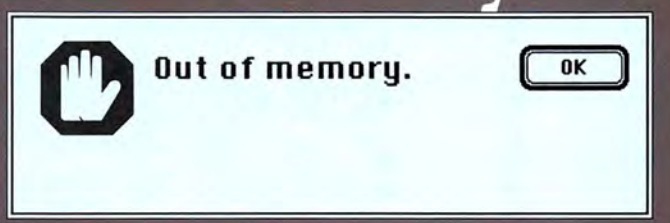
ONLY ON SONY RECORDING MEDIA

CIRCLE 168 ON READER SERVICE CARD.

Table 1: Vendors and Products

Company	RAM drives	Removable magnetic media	Hard-disk drives	Magneto-optical drives	Tape drives	SCSI cards	Formatting software
ADARA		●	●	●	●		
Anthem Technology Systems			●	●	●		
APS (Alliance Peripheral Systems)		●	●		●		
ATTO Technology	●					●	
Blackhole Technology					●		
Bytewide			●	●	●		
Casa Blanca Works							●
CD Solutions		●	●	●	●		
CD Technology			●				
ClubMac		●	●		●		
CMS Enhancements		●	●	●	●		
Computer Upgrade				●			
Contemporary Cybernetics Group				●	●		
Core International			●	●	●		
Corel Systems				●			●
Cranel			●	●	●		
Cutting Edge		●	●	●	●		
DayStar Digital	●					●	
Deltaic Systems		●	●	●			
DGR Technologies				●			
DirectTech			●				
Dynatek		●	●	●	●		
Ehman		●	●	●	●		
EMAC				●	●		
ETC (Exportech Training Corp.)		●	●	●			
Flexsys				●	●		
FWB		●	●	●	●	●	●
GCC Technologies		●	●				
GigaTrend					●		
Golden Triangle Computers							●
HDI (Hard Drives International)		●	●		●		
Hewlett-Packard			●	●	●		
IDE (International Data Engineering)				●			
Introl				●			
Iomega		●					
Jet Cybernetics						●	
Kalock			●				
Kintronics				●	●		
La Cie		●	●	●	●		●
Laser Magnetic Storage				●			
Liberty Systems		●	●	●	●		
Loviél Computer		●	●	●	●	●	●
MacDirect		●	●	●	●		
MacFriends			●	●			
MacLand		●	●	●	●		
MacPEAK Research							●
MacPower		●	●	●	●		
MacProducts USA		●	●	●	●		
MacTel Technology		●	●	●	●		
MacTown		●	●	●	●		

Coming soon to a screen near you.



If you think the only way to avoid running out of memory is to avoid running a couple of your favorite applications, think again.

Think about all those memory-hogging fonts and sounds you've got stuffed into that bulging System File.

Then do what over 200,000 resourceful Mac users do every day.

Instead of closing your applications, open a Suitcase.™

Suitcase is the award-winning utility that lets you park your growing collection of fonts, DAs, FKEYs and sounds *outside* the System File.

Thereby giving you the maximum amount of memory for running more applications, building bigger documents and doing other useful things.

What's more, Suitcase compresses your screen font and sound files by up to 60%.

Thereby giving you that much more precious disk space to work with.

It even lets you put your screen and printer fonts on a server for all to share.

Thereby making each disk on the network that much more spacious.

The more resources you have—and the more organized you are—the more memory and disk space you'll save.

But whether your dividends are measured in megs or merely in Ks, Suitcase is guaranteed to save you gigabytes of aggravation.



Even if you're operating in System 7.

Because System 7 still stuffs your resources into your System File.

And System 7 still makes you close down all your applications and restart your Mac each time you install a new font.

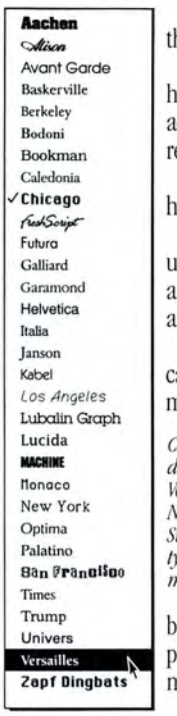
Which is a real pain in the, uh, system.

Suitcase, on the other hand, gives you unlimited access to all your resources.

And total control over how you organize them.

Each suitcase can pack up to 800 fonts, 64 DAs, and any number of FKEYs and sounds.

You can group suitcases into sets, then summon all the luggage that belongs with a particular project at the click of a mouse.



Can't remember the difference between Versailles and Monaco? Not to worry. Suitcase displays your typefaces right in the menu.

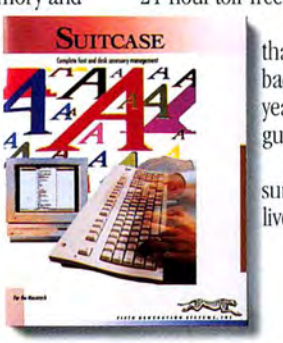
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Mass Microsystems		●	●	●	●		
Maynard Electronics					●		
MegaDrive Systems		●					
Memorybank					●		
Micro Design International				●			
MicroNet Technology		●	●	●	●	●	
Microtech International		●	●	●	●	●	
Mirror Technologies		●	●	●	●		
Newer Technology	●					●	
NKK Electronics America				●			
NovaStor					●		
OAI (Optical Access International)				●			
OCEAN Microsystems				●			
Omnishore Electronics			●	●	●		
Optical Media				●			●
Optima Technology		●	●	●	●	●	
Panasonic Office Automation Group				●			
PCPC			●	●	●		
Peripheral Vision		●	●	●	●		
Pinnacle Micro				●			
PLI (Peripheral Land, Inc.)		●	●	●	●	●	
Procom Technology		●	●	●	●		
Rancho Technology		●					
Relax Technology		●	●	●	●		
Rodime Systems		●	●	●			
Sankyo Seiki					●		
Saturae		●	●		●		
Software Architects							●
Storage Dimensions			●	●	●	●	
Sumo Systems		●	●	●			
Sysgen		●	●		●		
Tandberg Data					●		
Tass Optical World		●		●			
Tecmar				●	●		
Ten X Technology				●			
Third Wave Computing		●	●	●	●		
TMS Peripherals		●	●		●		
Total Peripherals		●	●				
Total Systems						●	
TTi (Transitional Technology, Inc.)					●		
Tulin Technology		●	●	●	●		●
VCP Computer		●	●			●	
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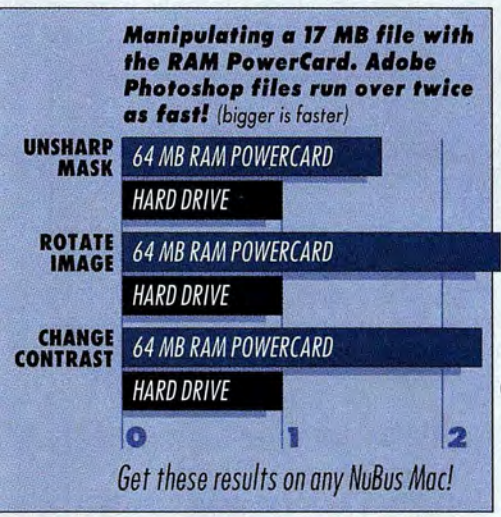
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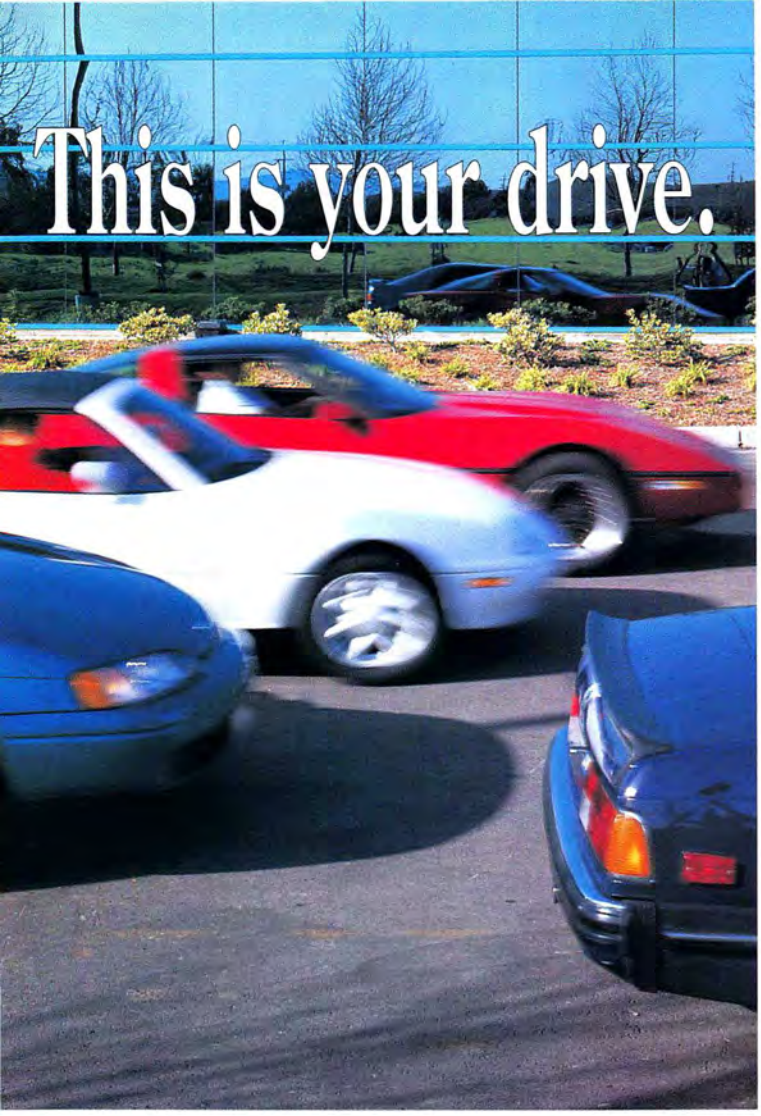
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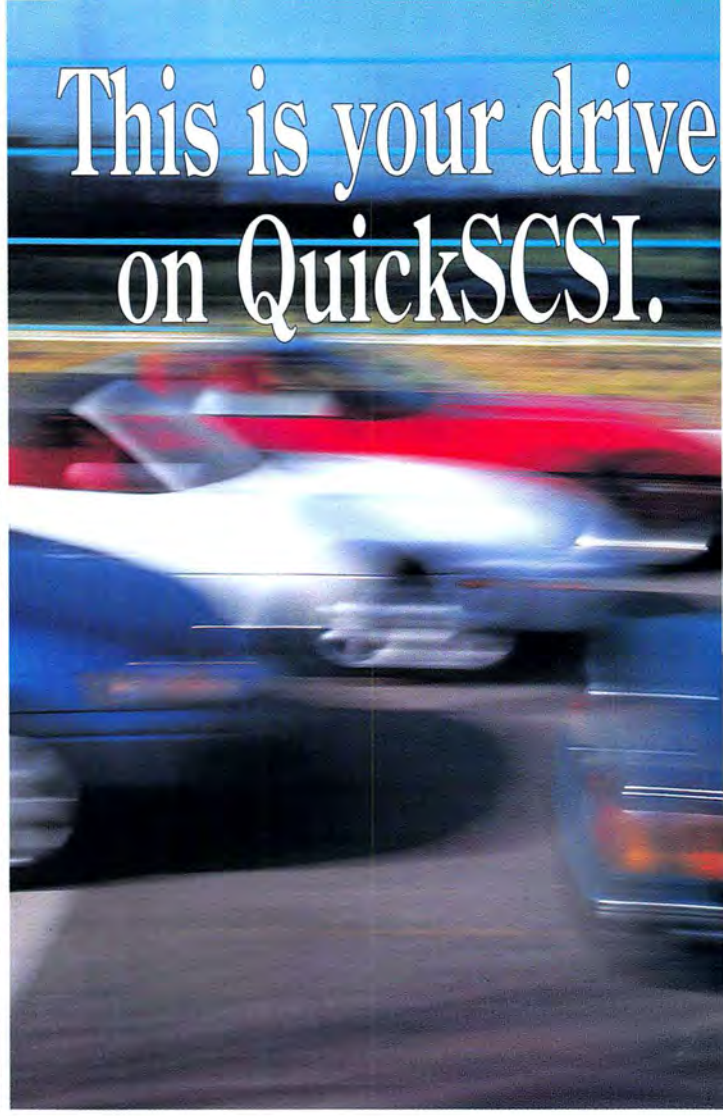
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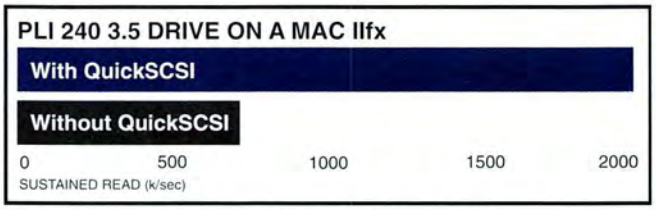
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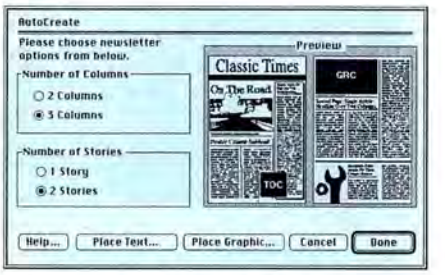
CIRCLE **181** ON READER SERVICE CARD.

PLI

MUSE AD-27

Does *bleed* only mean "to shed blood"? Is *RIP* merely short for "rest in peace"? Are *CIE, PMT,* and *TIFF* groups of random letters? Find the answers in *The Complete Color Glossary*, a compendium of more than 1,000 color-related terms — including trademarks such as *Cromalin* — used in color publishing, graphics, typography, and video. Some definitions are incomplete and others are too techie, but overall it's well worth the $24.95 investment. Available from The Color Resource, 716-346-2776.

By Aileen Abernathy



Publishing by proxy: If you don't want to sweat the details of your publication, Aldus' **Personal Press 2.0** takes automation to new heights. "Intelligent" AutoCreate templates (right) guide you through the creation and assembly of publications via graphical previews, or "proxies." A copyfitting feature automatically adjusts text to fit a given space, and QuickTime support lets you drop a frame from a home movie into your holiday letter. Some features, such as drop caps and bulleted text, are handled through extensions called **Aldus Additions** — not to be confused with PageMaker's Aldus Additions, which are incompatible. (Now *there's* a marketing challenge.) Unfortunately, Personal Press also resembles PageMaker in another area: It still can't open multiple documents. Personal Press now costs just $199; upgrades are $40.

TrueType returns: Just when you thought TrueType was moot on the Mac, Type Solutions has hatched **The Incubator!,** a $150 utility that lets you create new TrueType fonts by tweaking the weight, width, contrast, and/or slant of existing ones. This may sound like Adobe's Multiple Masters for Type 1 fonts, but the products are miles apart. **Multiple Master** technology produces font variations by interpolating among several sets of specially tuned outlines contained in a special Type 1 font. The Incubator! works on the unoptimized outlines of garden-variety TrueType fonts. Minor tweaks produce decent-looking fonts, but dramatic changes can cause horrendous results, particularly with serif fonts. 603-382-6400. ➥ If you want some fonts to run through The Incubator!, **Monotype** offers the TrueType ValuePack, seven compatible text and display fonts, for $89. 312-855-1440.

Colorful catches: Barneyscan's top-notch scanning and color-separation program, **CIS•ColorAccess,** is now available as a stand-alone product for use with color flatbed scanners. For $695, CIS•ColorAccess provides such high-end tools as automatic selection of highlight and shadow points, custom tone curves, sophisticated color correction, and unsharp masking. A major **marketing mistake:** The program is hardware copy-protected with the Eve dongle. 510-562-2480. ➥ For those who long for a library of already-scanned images, 21st Century Media offers **PhotoDisc,** a series of 24-bit stock color photos. Each collection comes in three formats — low-resolution PICT and TIFF and 300-dpi compressed TIFF. Volume I: Business and Industry contains 408 images of urban life, occupations, transportation, people, sports, textures, and nature. Next out is Lifestyles and People, followed by Backgrounds and Textures. $395 (CD-ROM) or $498 (floppy disks). 206-441-9355.



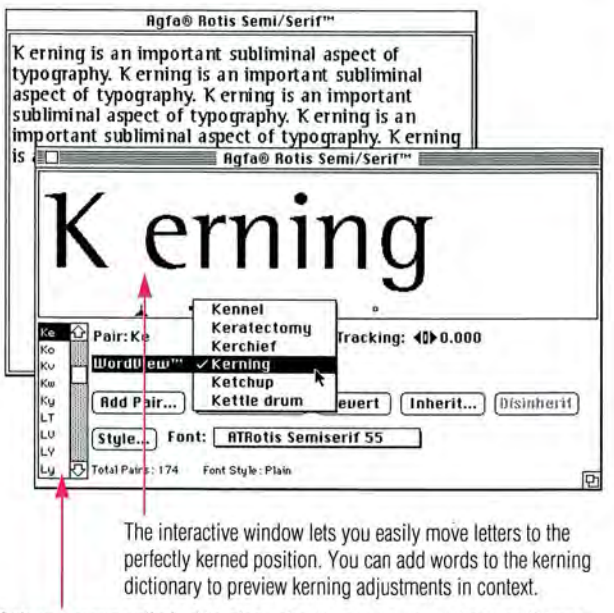
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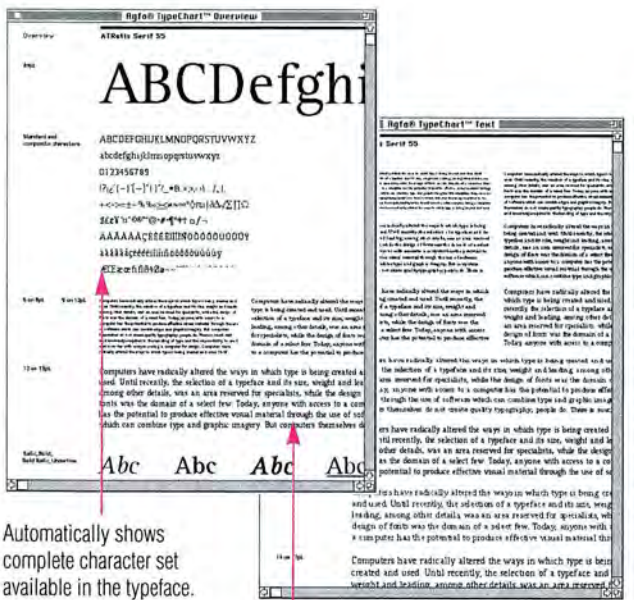
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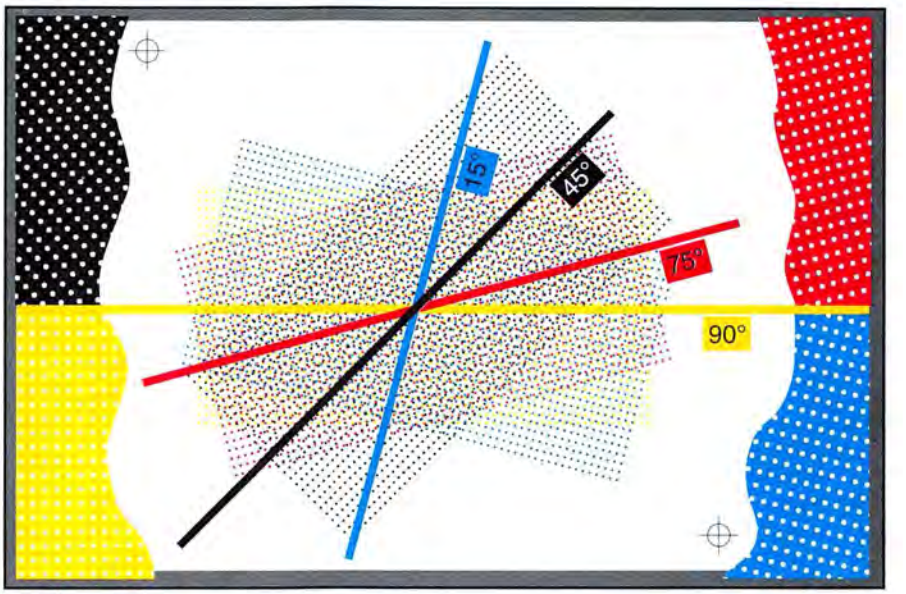
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That's a Moiré

If you do color separations from the desktop, chances are you've seen printed photographs covered with a distracting doily pattern. That's a moiré.

By Bruce Fraser



Printing full-color images is a highly skilled craft, much more complex than doing monochrome or spot-color work. Considering the difficulty of the process, it isn't surprising that Mac-based desktop publishing has been relatively slow in penetrating the color-prepress market. But the trend is clear: Color is the future of desktop publishing, and the question is no longer *whether* to use desktop technology but *when* to do so.

The Mac still can't handle color work as well as dedicated high-end systems can. Prepress-sized files present serious storage problems, and the lack of a color standard often makes calibration a guessing game. But one persistent problem has its roots in PostScript itself — a visible dot pattern, called *moiré,* in color images (see Figure 1).

What causes moiré and how can you minimize it? This two-part question requires a two-part answer. In this article, we explain how moiré occurs, including the differences between traditional and digital halftones, the importance of screen angles, and the printing process itself. In an upcoming issue, we'll take a look at how companies such as Adobe, Agfa, Linotype-Hell, Optronics, and Scitex are solving the moiré problem for desktop color separations.

Optical Illusions

Before we discuss how color images are printed, let's start with a simpler example: reproducing a black-and-white photograph on a printing press, using black ink and white paper. A close examination of a newspaper photograph reveals a pattern of dots, called a *halftone* (see Figure 2). The halftone's dots are large in the dark areas of the image (the shadows), medium-sized in the middle grays (the midtones), and very small in bright areas (the highlights). The distance between the center of the dots, however, is always constant. And even though the image is composed of dots, each printed with the same density and ink color, the eye sees a uniform picture that contains shades of gray.

Halftones take advantage of an optical illusion that results from the limited acuity of human vision. Our eyes can't distinguish two points when they are separated by only $^1/_{60}$ of a degree, which is equivalent to $^1/_{250}$ of an inch at a reading distance of 12 inches. Thus, the eye can be fooled into perceiving shades of gray or color if an image is converted to a pattern of small, equally spaced dots of varying sizes, as long as the dots are placed very close together.

Making a traditional halftone involves photographing the original image through a screen — a grid of thin, regularly spaced opaque lines that intersect at 90-degree angles. The holes in the screen act like pinhole lenses, producing dots on the film proportional to the amount of light reflected from the original art. The sharpness of the halftone depends on the spacing of the lines in the screen. This *screen frequency* is usually expressed in lpi (lines per



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Figure 1: Moiré — such as the distracting interference pattern shown here — is a problem in color DTP. Moiré can be minimized in traditional color separations by rotating the halftone screens to precise angles. Because of the way imagesetters simulate the halftone process, however, they can't always reproduce the conventional angles and screen frequencies. As a result, they produce moiré problems.

inch). Typical screen frequencies are 65 to 85 lpi for newspapers, 120 to 150 lpi for magazines (*MacUser* uses a 133-lpi screen for color photos), and 175 lpi and up for high-quality art books.

The other factor to consider with a halftone screen is its orientation, or *screen angle*. The underlying pattern of dots in a halftone is most obvious when the screen is vertical (0 degrees) and least obvious when the screen is oriented diagonally. Therefore, in monochrome printing, the screen is usually rotated 45 degrees.

Reproducing a full-color photograph is a bit more complicated, because printing presses and imagesetters are binary devices that see everything in black and white — or rather, ink and paper. They can only make a mark on the paper or film or leave it blank. Because it's impractical to use millions of different-colored inks, full-color-image printing uses the *four-color process*.

This technique produces the full spectrum of color by printing superimposed halftones in the three reflective primary colors — cyan, magenta, and yellow — plus black. In theory, you can obtain the entire range of printable color by using varying intensities of cyan, magenta, and yellow inks; combining 100 percent of each should give you black. In practice, overprinting full intensities of the three

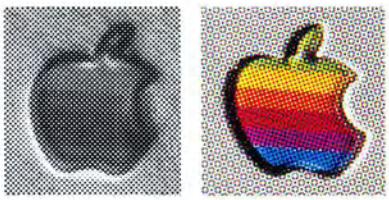
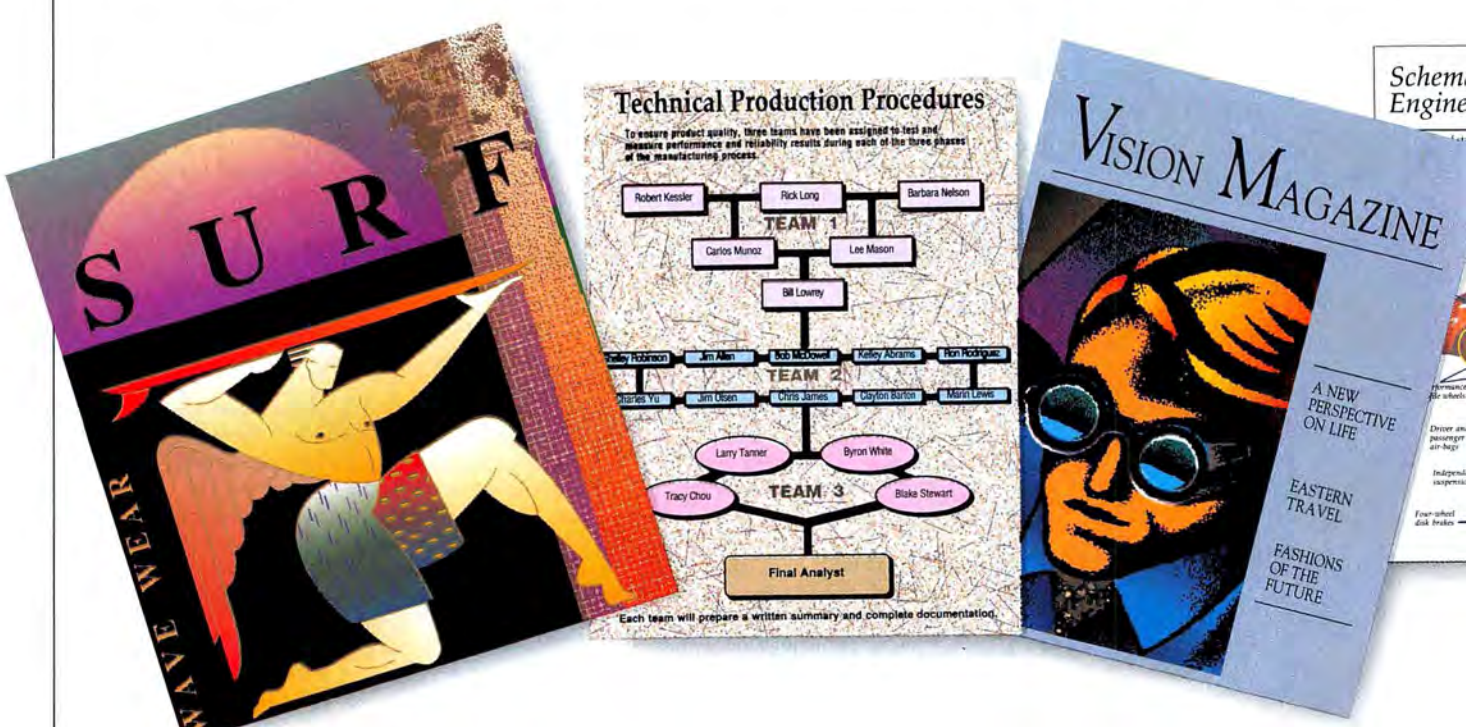


Figure 2: The pictures you see in newspapers and magazines are actually made up of dot patterns called halftones, because a printing press can print only a single color of ink on paper. For black-and-white photographs, simulating shades of gray means varying the dot sizes (left). To reproduce full-color images, four superimposed halftones are printed in cyan, magenta, yellow, and black (right).

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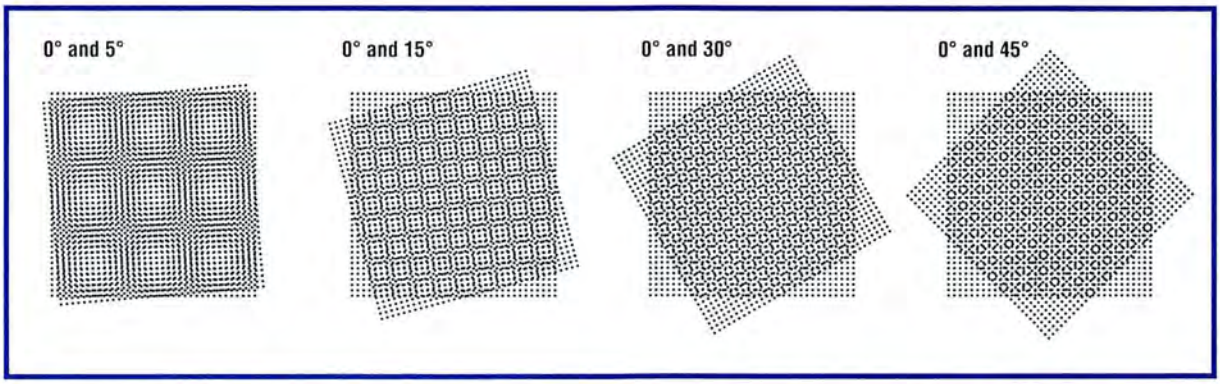


Figure 3: Moiré is the interference pattern that occurs when two or more geometric grids, such as halftone screens, are superimposed at an angle. If the angle between screens is small, blatant interference patterns will occur. Moiré becomes less visible as the angle of separation increases. The maximum separation angle possible between two screens is 45 degrees.

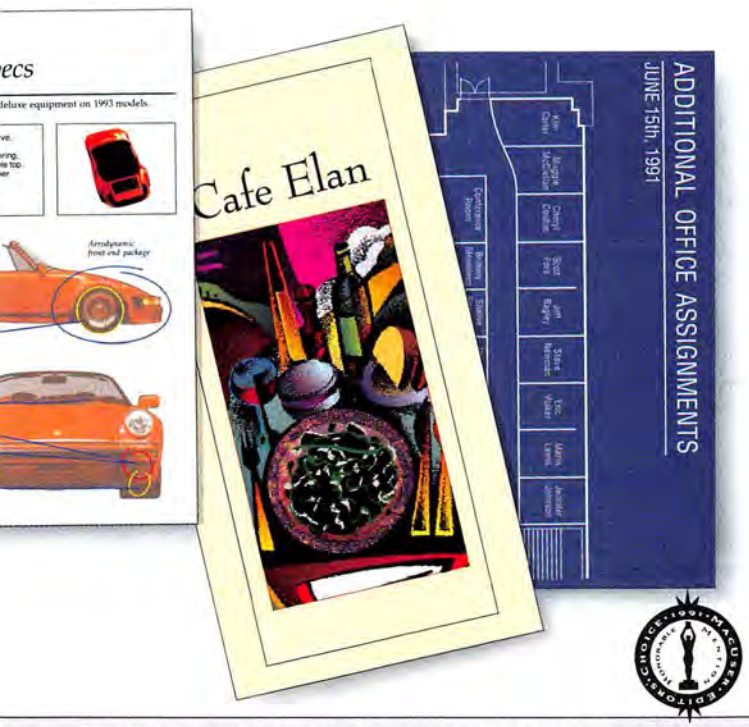
colors produces a muddy brown, so black is added as a fourth color.

Traditionally, you separate a color image into cyan, magenta, yellow, and black components by photographing the original image four times through a halftone screen, using a different filter for each color. For example, shooting with a red filter produces a cyan halftone, because subtracting the red component from white light leaves cyan. A separate plate is made for each halftone, and the colors are printed in sequence as the paper moves through the printing press.

The Right Angles

The four-color process sounds straightforward — but there's a catch. If you simply print the four halftones directly on top of each other, the inks blend together, producing mud. The halftone dots must therefore be arranged so they are adjacent

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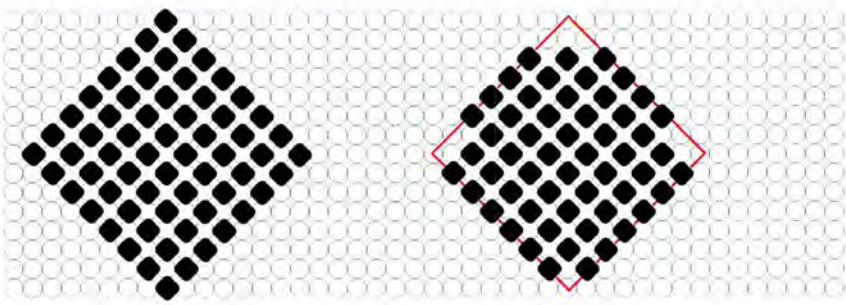
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Rotated cell on grid

Varying cell size on grid

rather than directly on top of each other (see Figure 2).

It's possible to print all four halftones at the optimum 45-degree angle, offsetting each color dot slightly from the others. The resulting image is composed of quartets of cyan, magenta, yellow, and black dots arranged in a tight square pattern. Many color thermal-wax and inkjet printers use this approach, but for press work, it has a major disadvantage — any shifting or stretching of the paper results in sudden color shifts.

To avoid color miscues on the printing press, the four halftone screens are rotated to different angles so that the dots form a tight, distinctive pattern called a *rosette*. This is where the moiré problem rears its ugly head.

Moiré is the interference pattern that occurs when two or more geometric grids, such as halftone screens, are superimposed at an angle. It can be pleasing in screensaver utilities or in psychedelic light shows, but in four-color printing it's a no-no, particularly when it makes an image look like a carpet of lace doilies. Moiré can't be completely eliminated, because of the way the four-color process works; the goal is to render it imperceptible (see Figure 3).

Objectionable moiré can have several causes. The angles of the four halftone screens are the most critical factor. Also, early imagesetters weren't designed for color work and they weren't accurate enough to produce the tight registration color separations require. Irregularities in the printing press can also cause moiré. But the main culprit in digital publishing has been the screen-angle technology used by PostScript imagesetters (more on this in a minute), compounded by the fact that moiré is particularly noticeable at the low-to-medium screen frequencies of 85 to 150 lpi that are used to output most desktop color work.

As mentioned earlier, the angles of the halftone screens are of paramount importance in minimizing moiré. The smaller the angle between screens, the more obvious moiré becomes. A screen is composed of lines that intersect at 90 degrees, so the largest angle possible between the lines on two screens is 45 degrees. But for full-color printing, we have to deal with four screens, not two.

The next-least-objectionable angle, 30 degrees, provides room for three screens without overlap, and this is what the traditional four-color process uses. Black, the darkest color, is printed at 45 degrees, the angle at which the screen pattern is least noticeable. The cyan and magenta screens are each separated from the black screen by 30 degrees; cyan is usually set at 15 degrees and magenta at 75 degrees. Yellow is chosen for the odd angle because it's the lightest color and therefore least likely to produce visible moiré. The largest separation available for the fourth screen is 15 degrees, and it should also be as far as possible from the darkest color, black. Thus, yellow is set at 90 degrees.

When halftone separations are produced photographically, it's relatively easy to precisely control the screen angles and frequencies; you use the same halftone screen for all four separations and rotate it mechanically to the correct angle for each one. This is important, because an angular error of just 0.05 degrees or a slight misregistration between the screens can result in an obvious moiré.

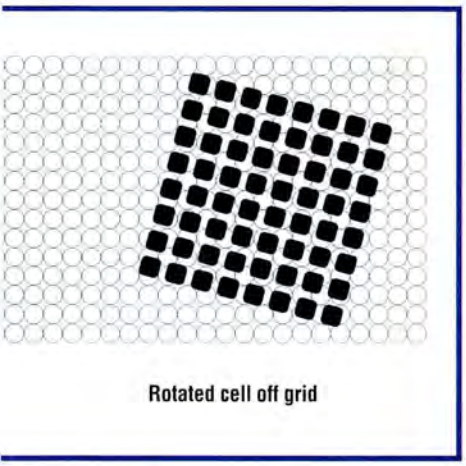


Figure 4: Imagesetters simulate traditional halftones by grouping laser spots into cells. The underlying imagesetter grid limits the available screen angles, however. The cell at left is rotated to 45 degrees; this works because its spots fall directly on top of spots in the grid. By varying the number of laser spots that are printed (center), the cell can imitate the varying sizes of halftone dots. The cell at right is rotated to 15 degrees; this angle is unusable because the cell is off the grid and the imagesetter can't print just part of a laser spot.

The Digital Difference

PostScript imagesetters strive to produce the conventional screen-angle set of cyan at 15 degrees, black at 45 degrees, magenta at 75 degrees, and yellow at 90 degrees. Unfortunately, it's difficult for imagesetters to reproduce exactly the traditional angles while maintaining the same screen frequency on each plate. No matter what angles and frequency you specify, the resulting halftones often have slightly different values. This discrepancy is a direct result of the way imagesetters simulate the halftone process.

An imagesetter can't print the variable-sized dots of traditional halftones. Instead, it has a fixed grid of printable dots, like the holes in a pegboard, albeit on a very small scale. These printable dots — variously known as laser spots, rels (recorder elements), and pixels — are all the same size. The imagesetter is unable to vary either the size or the position of the laser spots — all it can do is print a given laser spot on the grid or leave it blank.

To simulate halftones, the imagesetter groups laser spots into *cells,* where each cell corresponds to a single traditional halftone dot. By varying the number of laser spots that are actually printed within the cell, the imagesetter simulates the varying sizes of halftone dots. For example, a halftone cell of 16 x 16 laser spots on a 2,450-dpi imagesetter simulates a halftone screen frequency of 153.125 lpi (2,450 ÷ 16). Each 16 x 16 cell contains 256 laser spots, so varying the number of laser spots printed can produce any of 256 levels of gray. The result is almost indistinguishable from a traditionally produced halftone.

Printing halftones on an imagesetter isn't quite that simple, however. For example, there's a trade-off between screen frequency and the number of levels of gray. A higher screen frequency gives a smaller halftone cell and a more detailed image, but because the halftone cell is smaller, it contains fewer laser spots and therefore can represent fewer shades of gray.

But the real problems — including moiré nightmares — arise when you rotate four halftones, all with the same frequency, to the angles used for color separations. When the halftone cell is rotated, its spots must fall directly on top of spots in the underlying grid, because the imagesetter can't print just part of a laser spot (see Figure 4). This drastically limits the angles available. The actual rotation angles possible depend on the imagesetter's resolution and on the screen frequency chosen — the higher the resolution and the lower the screen frequency, the more angles that are possible.

But don't despair — there *are* some ways to get moiré-free color separations from an imagesetter. In an upcoming issue, we'll take a look at the techniques used by high-end prepress vendors such as Scitex and also at new technologies from the mainstream players in the PostScript market. Linotype-Hell's HQS, Adobe's Accurate Screens, Agfa's Balanced Screening, Optronics' IntelliDot II, and Hyphen's Spectracell are all attempts to provide moiré-free desktop color separations.

Contributing editor Bruce Fraser is the coauthor of *Adobe Illustrator 3.0 Complete* and *Using FreeHand 3.0.*

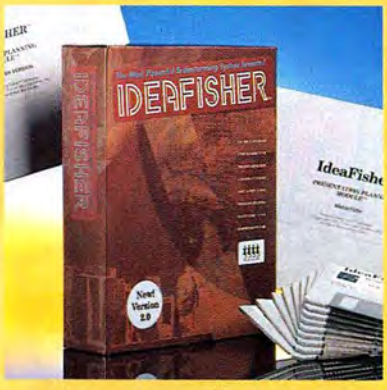


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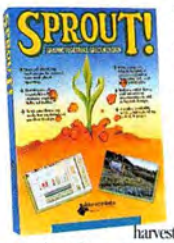




IdeaFisher 2.0

❼ IdeaFisher is a powerful productivity tool designed to turn your computer into a brainstorming and problem solving partner. Use it to generate creative ideas for new products, marketing strategies, articles, stories or scripts, advertisements, promotional materials and many other tasks requiring new ideas. This interactive idea tool triggers your brain to break out of its habitual rut and to think in new and innovative ways. With 705,000 idea associations and nearly 6,000 thought provoking questions, you'll quickly produce great ideas. IdeaFisher is expandable. Use the built-in tools to create your own personal library and sets of questions. **Publisher: Fisher Idea Systems BUS0168**

$389



Sprout!

❼ Sprout! is a complete computer planning tool for vegetable gardeners. Its unique planting tool snaps to correct row and plant spacings and automatically fills in plant symbols, producing a graphic, scalable garden plan. In addition, Sprout! contains a fully editable database of vegetables for 7 climate regions containing: planting and harvesting times, yield, soil PH, growing tips, and other information. Standard text and drawing tools are included allowing users to create their own vegetable symbols and customize garden designs. Sprout! prints out garden layouts, calendars, shopping lists, and reports.
Publisher: Abracadata GRA0339

$45



Active Memory 2.0

❼ Finally, a feature-rich personal information management (PIM) program designed for networks! Active Memory includes a mini-calendar, a free-form approach to contact management and dynamic reminders-the bonus is that Active Memory can be used for all of these purposes and share these features over a network. Use it to manage personal info as well as projects involving other users on a LAN. Active Memory features also include publish/subscribe, import/export, multi-level sorting and auto-phone dialing. And it's System 7.0 Savvy too! Great for Powerbook users. **Publisher: ASD Software BUS0207**

$125

TrueLaser Printer



❼ The TrueLaser is Microtek's answer to fast and versatile laser printing . It offers 300 dpi resolution, comes with 35 built-in True Type fonts and is PostScript and HP PCL4 compatible. Its autoswitching capability allows it to change automatically between its AppleTalk, Centronics and RS-232C interfaces. The TrueLaser is also one of the fastest printers in its class. It's powered by the AMD 29000, 32-bit microprocessor and comes standard with 2M of RAM and can be upgraded to 3MB or 6MB. **Manufacturer: Microtek INP0162**

$1399



WristSaver/ WristSaver MousePad

The WristSaver cradles your wrist with a contoured neoprene rubber pad and a nylon covering. It's ergonomically designed to support your wrist at the proper angle to help avoid the pain associated with Carpal Tunnel Syndrome. The WristSaver MousePad provides a comfortable rest for your wrist, plus a conventional mouse pad. Simple finger movements replace sliding the entire arm or hand.
Manufacturer: LB Innovators
WristSaverMousePad **ACC0635 $15.**
WristSaver **ACC0560 $15.**
Bundle **BND0033**
(Available in Gray, Black, Red or Navy)

$25



HayesConnect™ Version 3.0

❼ Turn your modems, printers, plotters, and other serial devices into shared resources on your AppleTalk network. HayesConnect is the software solution that expands the usefulness of your peripherals by enabling you to share a wide variety of serial devices connected to Macintosh® computers on any AppleTalk® network. Sharing resources on your network gives you greater versatility, convenience, and cost control. For example, HayesConnect allows you to share the use of high-speed modems among many network users. No need to buy modems and phone lines for everyone; simply use HayesConnect to pool a few modems for the use of everyone in your group.
Publisher: Hayes COM0095

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NEW

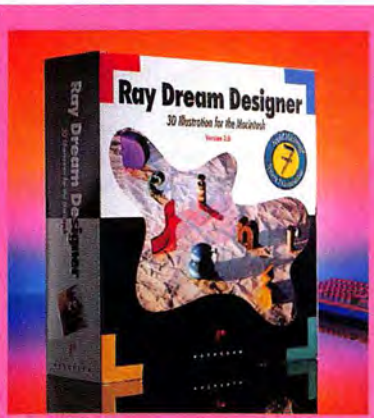
WindoWatch 1.52

❼ Track the hours you spend on a project with WindoWatch. It's a must for professionals who bill their services by the hour (or minute). WindoWatch operates in the background, automatically generating a timesheet as you work. Use WindoWatch to collect and merge timesheets from team members over the network or export timesheet information to a spreadsheet. Don't miss any opportunity to accurately bill your clients. After all, time is money. **Publisher: ASD Software UTI0264**



Single User

$89



Ray Dream Designer 2.0

❼ You don't have to settle for flat illustrations and designs any longer. Ray Dream Designer's drawing and text tools, for creating lines, circles, ellipses, polygons, Beziers, colors and shadings, are virtually the same as those in most 2D illustration programs. The only difference is, now your objects have the realistic look of three dimensions. Wrap them around an object or text for instant dimension. Comes with a library of 3D solid textures you can use as-is or customize. Lightning, shadows, transparency, reflections and, best of all, perspective are all handled automatically. Requires: Mac II family with coprocessor, 32-bit QuickDraw; 4MB RAM and hard drive. **Publisher: Ray Dream GRA0292**

$629



Newest Edition!

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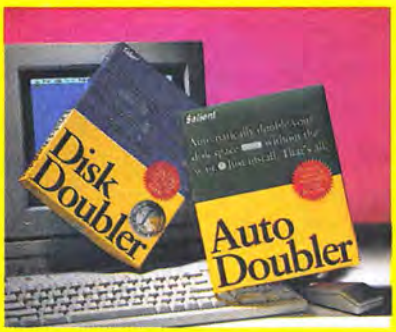
- LightningPaint–A powerful black & white paint program with features to rival the best.
- FrontView–Find and select any character in a font, no matter where they are hidden.
- Merge Scrap–Merge multiple scrapbook files into one.
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Especially for System 7 users:

- Sound Extractor–Copy sounds out of any application, suitcase or system file, and convert them to a format you can use elsewhere.
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Six of the programs are shareware, so you can try them free of charge. If you wish to continue using them, the authors ask that you pay a small fee ($5-$15). 12 of the programs are absolutely FREE! All of the details are explained on the disk, which is yours to keep. Ask for item #AAA 0019 when you place your order. *$1.50 postage and handling charge applies.



AutoDoubler

❼ AutoDoubler is the easiest way to increase your hard disk capacity. It works in the background to automatically keep your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. In fact, AutoDoubler's new patent-pending technique lets your Macintosh use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions.
UTI0254 $49.

DiskDoubler 3.7

❼ DiskDoubler gives you total control of file compression-archiving for modem transfer, compressed backups, self-expanding files, and fast copying of files. AutoDoubler and DiskDoubler combined give you the ultimate in speed, convenience, and control. System 7 Savvy!
Publisher: Salient UTI0179

$49

ScanMaker 600ZS



❼ Unbeatable features at an unbelievable price. The ScanMaker 600ZS captures 24-bit color, 8-bit gray and black and white images at resolutions up to 600 dpi. It's perfect for all work from comps to final prepress projects. Also, it comes with a built-in Apple SCSI interface for easy installation and some of todays most useful graphics software. Included with the scanner is the full version of Adobe's PhotoShop, the Scanmaker plug-in and Savitar's Scanmatch color calibration software.
Manufacturer: Microtek INP0180

$1449

Aldus SuperPaint or Aldus Gallery Effects*



Aldus SuperPaint 3.0
❼ Five time winner of MacWorld magazine's World Class Award, new Aldus SuperPaint combines painting, drawing, and image enhancement, and includes 1 thru 24 bit color, textures, gradients, and EPS graphics. **GRA0112 $133.**
Aldus Gallery Effects ❼ **1991 MacUser's Editors' Choice Award for Best Visual Resource.** Aldus Gallery Effects automatically transforms grayscale and color bitmap images into stunning, sophisticated art, with 16 master effects including Graphic Pen, Watercolor, and Charcoal. Works directly within programs like SuperPaint and PhotoShop, or as an application or DA.
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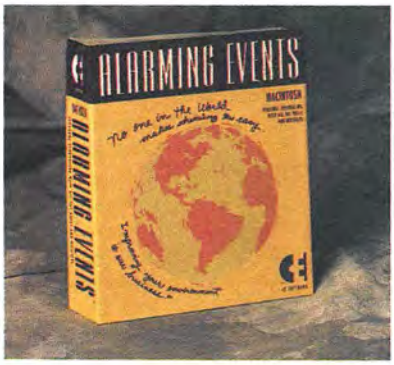
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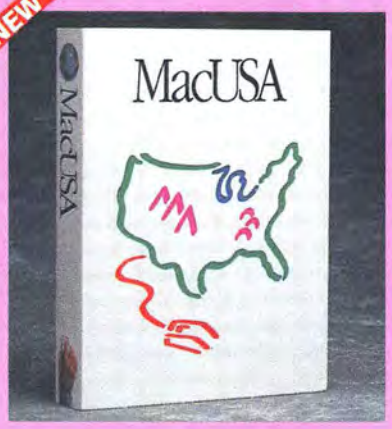
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From QuicKeys™ and DiskTop™ adding power to your desktop, to QuickMail™, helping you to communicate regardless of platform. We can help you do whatever you do, *better*. How do we know this? Simple.

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NEW



MacUSA

Every Mac user who wants fast, accurate information on the 50 states and Puerto Rico, coupled with superb maps and graphics, will love MacUSA. Provides you with an instant profile of each state that includes: city locations, elevations and natural features; demographic, economic, political, climate and health data; state history, tourist attractions, and time zones; state flags and entire state songs; simple print and export capabilities. For students, travelers, business people, and those who just want to know more about the United States. MacPlus or later model computers with System 6.0.4 or later.
Publisher: PC Globe GRA0246

$39



More After Dark

It's M.A.D.! It's More After Dark-Over 25 incredible new displays for After Dark, the Ultimate Screen Saver. Features contest winners; Mowin'Man, Tunnel, GraphStat, many beautiful new Fish!, Kittens, Art Museum, and Lunatic Fringe game module help save you screen form phosphor burn-in. (Requires After Dark.) **UTI0230 $25.**

After Dark 2.0

After Dark 2.0 displays over 35 screen savers including the classics, such as Flying Toasters and Fish!. Includes sound, password protection, logo and message display.
Publisher: Berkeley Systems UTI0119 $29.

More After Dark Bundle

Buy both and save. **UTI0231**

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The UnMouse



The UnMouse does everything a mouse can—only faster, easier, and in less space. To move the cursor, simply slide your finger over the glass surface. To make a selection merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you have a Power Keypad with 16 keys instantly available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs as a small graphics tablet. **Manufacturer: Microtouch INP0084**

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Accountant, Inc. 3.0.1

"BEST ACCOUNTING PACKAGE" 1991 MacUser's Editors' Choice Award. More Features, more Power, more Flexibility. It's easy to use and gives you exceptional streamlining power. Every transaction is automatically posted to your General Ledger. Accountant, Inc.'s new revolutionary System 7 design gives you the advantage of customizing your forms, screens and reports by hot linking with your favorite forms design, spreadsheet and database programs. You get Invoicing, Accounts Receivable, Inventory, Accounts payable, Check Writing, integrated General Ledge and Payroll. Accountant, Inc. is now available in single and multiuser versions.
Publisher: Softsync, Inc. FIN0048

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ExpertColor Paint is a simple to use yet powerful color paint program with many extras including 32-bit color, image editing and multiple undo's. By using a vast array of painting tools, you can create great looking art. You won't believe how easy the customizable tools make painting. There are multiple adjustable paint brushes, spray paint, paint cans and more to help create sophisticated art or touch up existing pictures. It's like having a fully equipped art studio at your disposal. Offers advanced image editing features like blur and sharpening filters and includes a free bonus clip art disk ($24.95 value). **Publisher: Softsync, Inc. GRA0318**



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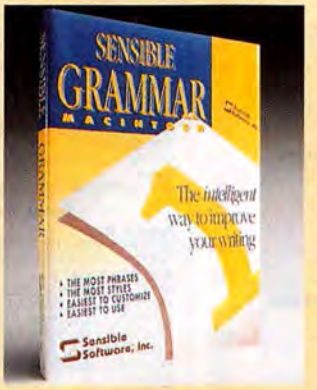
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❼ Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series IIs, IIIs and the Deskjet 500. Prints text and graphics at the printer's maximum resolution. Does not require PostScript. Cable is included. **Publisher: Insight Development UTI0098**

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FontBank PostScript Display Typefaces



The FontBank PostScript Display typefaces give you a library of 250 type1 PostScript display typefaces. Build a versatile type library with designs ranging from the simple sans serif to the extreme ultra serif. Use them to create attention-getting headlines, subheadings, titles, logos and special text effects. Included in the package are traditional, decorative, novelty, script, brush and calligraphic faces. Use these faces as a counterpoint to regular text or with design programs. With FontBank fonts, you get full-featured screen and printer fonts at an affordable price.
Publisher: FontBank FON0438

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❼ The latest version of this award winning 3-D drawing program provides everything you need to quickly capture and explore your ideas in 3-D. Multiple windows and extensive drawing aids provide an interactive environment for editing and viewing your ideas. Interactive 3-D presentations, QuickTime® and PICS animated movies and perspective pictures dazzle your audiences. Enhanced Imports of 3-D DXF, PICT, Claris®CAD and MacDraw; and Exports of 3-D DXF, 2-D DXF, Claris®CAD, MacDraw, PICT and EPS. Winner of MacUser Breakthrough Product of the Year Award 1990.
Publisher: Virtus Corporation GRA0278

$309

White Knight V.11

❼ The perfect low-cost solution to almost any Mac telecommunicator's needs. Offers the kind of power associated with products costing hundreds of dollars more, but is easier to learn and more flexible. 270+ page user manual is geared to all levels of experience. Winner of 11 awards including MacWorld's World Class Software Award 1987-1991.
Publisher: FreeSoft COM0060



$85



FileGuard

❼ "It's about as much software-based security as you can get in one package." MacUser, March 1992. Protect your hard drive from unauthorized access (including security bypass with a system diskette), copying and erasure; applications and file/folders (including System folder) from unauthorized access,deletion, and/or illegal copying; desktop from alterations by unauthorized users. Keep an eye on System usage with FileGuard's Users Log which continuously tracks user/group activity. For each protected file, FileGuard keeps a complete log of all operations performed, including creator & owner name, date/time of creation, total use time, attempts at unauthorized access and much more. System 7.0 Compatible. **Publisher: ASD Software** ***Office 5-Pack*** **UTI0130 $479.** ***Office 10-Pack*** **UTI0131 $799.** ***Single*** **UTI0135**

$139



Design Your Own Home:

❼ Design Your Own Home: Architecture, Interiors, or Landscape. Create floor plans, elevations and building plans with structural details that you can hand right to your contractor. Do individual room plans and kitchen/bath designs. Then complete your dream house with graphic landscape plans. Interiors and landscape programs generate 4 side views from top-view perspective. Sample plans are included.
Publisher: Abracadata

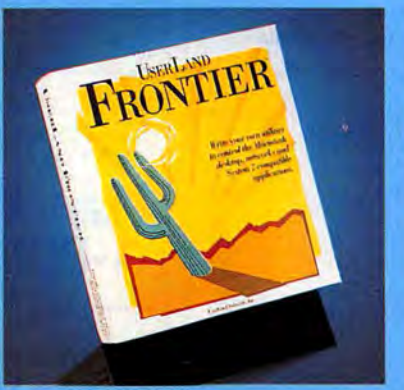
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Publisher: Softsync WRD0057



$29



UserLand Frontier

❼ With UserLand Frontier, you don't have to choose between pretty icons and the power to customize and automate your Macintosh. For the first time, you can have power and ease-of-use. Frontier is the first scripting software that allows you to write your own desktop utilities to customize, automate and simplify the Macintosh. Finally, there's an easy way to write scripts to manage networks and System 7-compatible applications. Frontier has all the development tools you need to get your scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When you're done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop.
Publisher: UserLand Software UTI0272

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The Mac Classic comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Additional memory for your Mac Classic is provided by an Expansion Board, which slides into a slot on the Classic's motherboard. The Expansion Board can be purchased with 1MB of memory (for a total of 2MB), and then two 1MB SIMMs can be added to the Expansion Board later, for a total of 4MB. Or, you can install a 3MB Expansion Board, which brings your Mac Classic up to its full 4MB. **CHP0050** 1MB Expansion Board....$79 **CHP0051** 3MB Expansion Board....$179.

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MACINTOSH PLUS & SE	4-256K SIMMS	ADD 2-1MB SIMMS	ADD 2-1MB SIMMS & 2-256K SIMMS	ADD 4-1MB SIMMS

The Mac Plus and Mac SE have four available slots on the motherboard, which originally contain four 256K SIMMs modules — totalling 1 megabyte (1MB) of memory. To upgrade, you can replace each 256K module with a 1MB module, but you must do this in pairs. Replace two 256K modules and you will have a total of 2.5MB of memory. (That's the two new 1MB modules plus the original two 256K modules.) Replace all four modules and you'll have 4MB. (You should save the 256K modules for later use if you want to pass your Mac on to someone else.)

	STANDARD	FOR 4MB	FOR 6MB	FOR 10MB
MACINTOSH LC	2MB SURFACE MOUNT	ADD 2-1MB SIMMS	ADD 2-2MB SIMMS	ADD 2-4MB SIMMS

The Mac SE/30, II, IIx, IIcx, and IIci each come with a total of eight slots. The standard configuration has four 256K SIMMs modules, or a total of 1 MB. Here, memory must be upgraded in multiples of four. This allows for expansion from 1MB to 4, 5 or 8MB on the II and IIx, and up to 32MB on the SE/30, IIcx and IIci, depending on whether you are using 1MB, 2MB or 4MB SIMMs. If you are upgrading a Mac IIci, you must use SIMMs rated at 80ns or faster.

	STANDARD	FOR 4MB	FOR 5MB	FOR 8MB	FOR 9MB (IIci only)	FOR 16MB (IIci only)	FOR 32MB
MACINTOSH SE/30, MACINTOSH II, IIx	4-256K SIMMS	ADD 4-1MB SIMMS	ADD 4-1MB SIMMS & 4-256K SIMMS	ADD 8-1MB SIMMS	ADD 4-2MB SIMMS & 4-256K SIMMS	ADD 8-2MB SIMMS	ADD 8-4MB SIMMS
MACINTOSH IIci, IIcx							

The Mac IIsi comes with a standard 1MB of memory, which is surface mounted (soldered) to the motherboard. Four slots are available for additional memory, and you must upgrade your Mac IIsi in multiples of four. The Mac IIsi is expandable to 5, 9 or 17MB, depending on whether you are using 1, 2 or 4MB SIMMs, and the SIMMs modules must be rated at 100ns or faster.

	STANDARD	FOR 5MB	FOR 9MB	FOR 17MB
MACINTOSH IIsi	1MB SURFACE MOUNT	ADD 4-1MB SIMMS	ADD 4-2MB SIMMS	ADD 4-4MB SIMMS

The Mac LC comes with a standard 2MB of memory, surface mounted (soldered) to the motherboard, with two slots available for additional memory. The Mac LC can be upgraded to 4, 6, or 10 MB, depending on whether you are installing 1, 2 or 4MB SIMMs.

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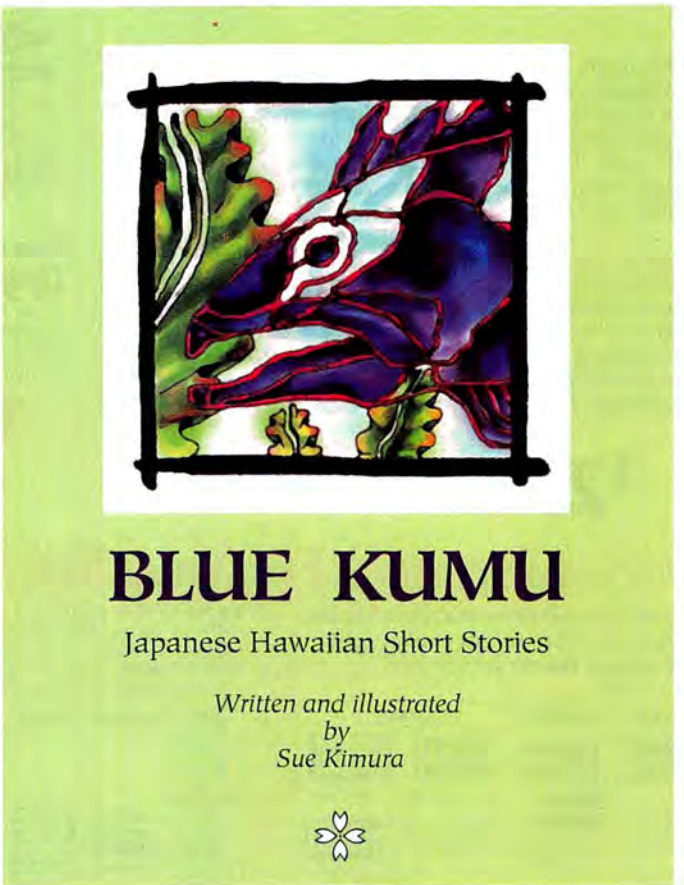
By Janet Ashford

One of the biggest complaints about digital artwork is, "You can tell that it was created on a computer." Computer-generated images lack the physical textures and subtle blendings of oil paint, watercolor, and chalk, not to mention their interactions with canvas and paper. But a new generation of painting programs — led by Time Arts' Oasis, Fractal Design's Painter, and SuperMac Technology's PixelPaint Professional 2.0 — is overcoming these objections by providing pressure-sensitive tools, customizable brushes, and libraries of digitized paper textures.

Foremost among these is Painter. Painter is the first program to accurately mimic natural brush dynamics and paper textures: You can actually *see* the brush marks in an oil painting and the nubby texture in a charcoal drawing. Other tools mimic chalk, felt pens, pencils, crayons, watercolor, and airbrushing.

Corinne Okada, of Rucker Huggins, a graphics-design firm in Mountain View, California, used Painter to quickly create a fish image for a book cover. The result convincingly imitates the way watercolors spread and bleed into each other on rough-textured wet paper.

Graphic designer Janet Ashford co-authored *The Verbum Book of PostScript Illustration.*



Designer Corinne Okada used Painter to create the watercolor image on this book cover. She painted the image with a mouse, but Painter also offers special features for use with a digitizing tablet and a pressure-sensitive stylus.

1 Choosing a Brush and Paper Texture



Tool: Hairy Brush
Method: Grainy Hard Cover
Paper: Watercolor 1



Tool: Airbrush with Fat Stroke
Method: Grainy Soft Cover
Paper: Small Canvas



Tool: Crayon
Method: Grainy Hard Buildup
Paper: Fine Grain

The Brush palette offers tools ranging from pencils to a watercolor brush. Customization is the secret of Painter's success in imitating natural media. You can select variants for each brush (such as Soft Charcoal or Japanese Brush) and specify its stroke behavior by selecting a method (Soft Buildup, for example). These choices can be further refined in other brush-related palettes. "Grainy" brushes interact with textures selected from the Paper palette.



2 Making a 'Pencil Sketch'

To begin her painting, Okada sets the paper color to a light brown, specifies a resolution of 300 dpi, and selects the Rough paper texture. She then uses the 2B Pencil with Grainy Soft Buildup to sketch a fish shape. At these settings, the pencil tool produces anti-aliased (smooth) strokes that react to the paper texture and build up color, becoming darker where they overlap. A Japanese Brush with an angled tip and Grainy Soft Buildup is used to paint the dark borders.



3 Adding the Basic Colors

Watercolor brushes in various sizes are used to add blues, reds, and greens to the sketch. Okada uses Soft Cover strokes, which have soft anti-aliased edges. If opacity were set at 100 percent, new strokes would completely cover underlying ones. But an opacity of 16 percent is selected, so that strokes build up color density more gradually.



4 Masking with Friskets

To add further detail in specific areas, Okada uses the knife tool to draw freehand *friskets* (Painter's term for masks) around sections of the fish and plants. The friskets are defined so that everything outside them is protected from changes. Within each frisket, a large brush is used to apply additional watercolor in darker, more opaque paint. The edges of the newly painted sections are smoothed with the water-drop tool.



5 Finishing the Image

Final coloring and highlights are added to the fish and plants with a variety of small watercolor brushes. The completed image is saved in TIFF format and opened in Photoshop, where the pale paper color around the outside of the image is selected with the magic-wand tool and deleted. The image is then imported into PageMaker to illustrate the book cover.

6 Variations on the Theme







Okada's artwork is easy to alter with Painter's customization and export capabilities.

Top: With the aid of a Wacom tablet and a pressure-sensitive stylus, color is added to the pencil sketch (see Figure 2). Painter's felt pens produce the look of a rough color comp.

Middle: The final image is repainted in the style of Van Gogh, one of the options available with Painter's unique Cloner brush. The Cloner brush can also be used to re-create existing images as pencil sketches, oil paintings, watercolors, and chalk drawings.

Bottom: The fish image is opened in Photoshop and treated with the Fresco filter, from Aldus' Gallery Effects. This filter adds darker, heavier strokes.



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CIRCLE 133 ON READER SERVICE CARD.

Photonics, maker of the infrared PhotoLink device for creating wireless LocalTalk networks, has adapted its Infrared Transceiver to work with laptops and notebook computers. Plug it in, and the reflective surfaces of your walls, ceiling, and floor become a network. Too bad you can't use it with your PowerBook. Although Apple is a major investor in Photonics, the new technology will be available first on TA Triumph-Adler AG Walkstation computers, and will come with NetWare — not AppleShare — client software. 408-370-3033.

By Henry Bortman

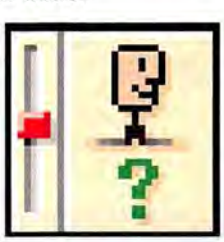


NetWare for less: If you want to connect your Mac to a NetWare server but don't want to spring for NetWare for Macintosh 3.01 (see review, November '91, page 152), you should check out these alternatives: **MACLAN Connect for NetWare,** from Miramar (805-966-2432), is a gateway to NetWare that runs on its own PC. With this product, Macintosh users on AppleTalk and PC users connected to NetWare can access file servers and printers on either network. $695 for a 40-user license. **NetMounter,** from Dayna (801-531-0600), is an extension that installs NetWare (IPX) protocols on the Macintosh. Once the protocols have been installed, you simply use the NetMounter icon in the Chooser to mount NetWare servers on your Mac's desktop. Single user, $99; five users, $395; ten users, $595.

Mail call: Novell's MHS (message-handling service) is one of the most popular E-mail systems around, and two new products bring its capabilities to Mac users. ✗ **If you want full access to a Novell MHS** mail system directly from your Mac, check out MacAccess from Da Vinci Systems (919-881-4320). MacAccess makes your Mac a full-fledged MHS client and provides a client DA. $395 for a five-user pack. ✗ **If you've already got QuickMail** and want a gateway to MHS, get in touch with CE Software (515-224-1995). With CE's QuickMail for MHS (pricing not available at press time), you can access MHS mail servers without ever leaving the comfort of your familiar QuickMail DA. ✗ **In case you were wondering what would happen to the MCI Mail gateways** for QuickMail and Microsoft Mail following Solutions' dissolution, they've been snapped up by MCI itself. MCI (202-833-8484) will support current installations of and provide future upgrades to CommGate MS and plans to ship CommGate/QM in the second quarter of this year. CommGate MS costs $595; expect similar pricing on CommGate/QM. ✗ **Microsoft's acquired the FAXgate gateway from Solutions,** renaming it — are you ready? — Microsoft Mail for AppleTalk Networks Gateway to Fax. *Seriously.* It ships with MailMaker software, which gives you network-fax capability from within any application. Pricing not available at press time. 206-882-8080.



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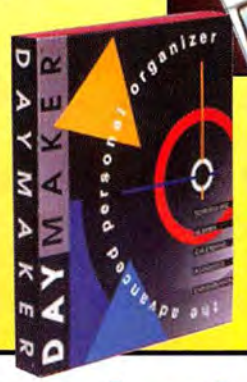
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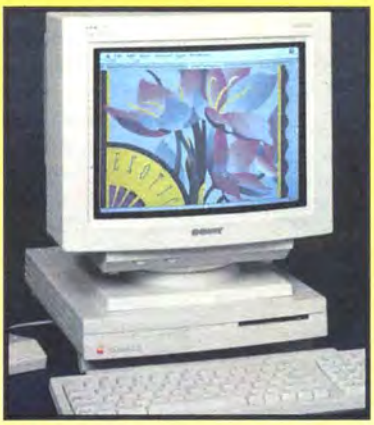
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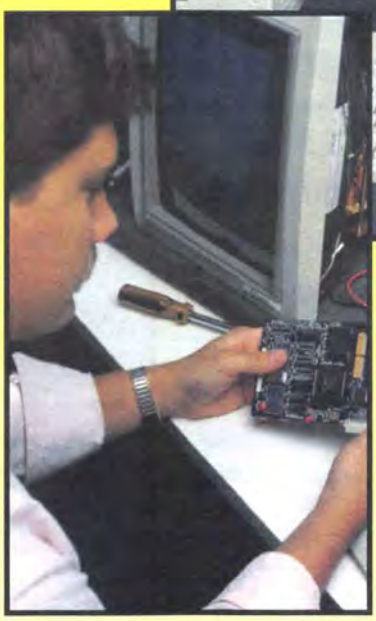
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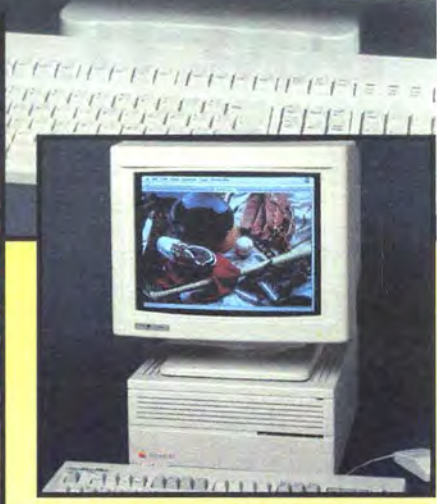
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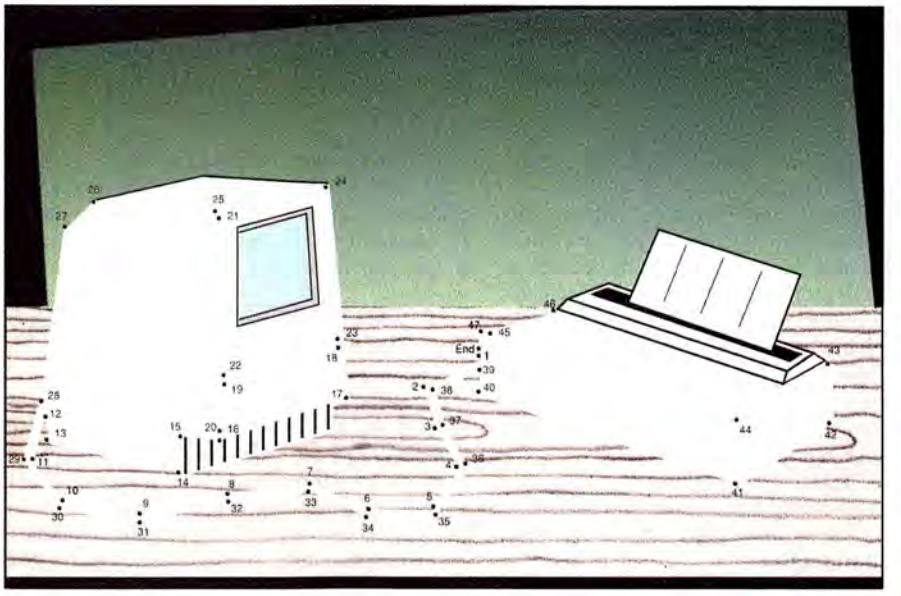
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Connecting the Dots

Access to the wide world of IBM-compatible dot-matrix printers can benefit your pocketbook — and your PowerBook.

By Andy Ihnatko



Back in the mid-80s, the ImageWriter seemed like a good idea — but then, so did listening to Duran Duran on vinyl. Now, with the advent of cheap laser printers and near-laser-quality inkjet printers such as the StyleWriter and the HP DeskWriter, dot-matrix printing seems as outmoded as long-playing records.

But just as there are still reasons to keep your turntable set up (do you *really* need a CD to hear all the nuances of Aerosmith?), there are advantages in being able to connect your desktop or portable Mac to a dot-matrix printer — especially one of the many inexpensive IBM-compatible printers that still dot the landscape, so to speak.

The Case for Dot-Matrix

Dot-matrix printers may not be fashionable in the Mac world, but they still offer several advantages:

They're Gloriously Inexpensive. Even when you include the costs of the hardware and software you'll need in order to get one to work with the Mac, an IBM-type printer will give you print quality similar to a StyleWriter's for almost half the price. ImageWriter quality can be had for almost a *third.* You might even discover a perfectly good IBM-compatible printer gathering dust in a closet; less than a hundred bucks in hardware can turn it into a productive part of your office's Mac system.

Multipart Forms Printing. Multipart forms, carbons, and mimeographs can't be used with laser or inkjet printers; only a device that prints by striking the page with force can punch an image through all those layers of paper. If your paper-pushers demand their forms in triplicate, a dot-matrix printer or a daisy-wheel printer are your only choices.

Oddball Printing Stock. A big drawback of laser and inkjet printers is that they're all geared toward printing on standard letter-sized sheets of paper. Several companies can sell you labels, index cards, and the like arranged on 8-x-11.5-inch sheets for use with laser printers, but the greatest variety of printing materials and styles is available for dot-matrix printers, often with greater ease of formatting. With a wide-carriage dot-matrix printer, you can print an entire 132-column spreadsheet on a single page without resorting to taping sheets together or having to settle for scrunched-up text. And continuous-feed paper lets you print those festive "Happy 29th Birthday, Gladys!" banners everyone loves so well.

They've Infested the Entire Planet. Much like male executives with ponytails, IBM-compatible printers can be found in most American offices these days. So PowerBook owners, take note: If you travel with a small cable and software that let you connect IBM printers to Macs, you're bound to find *something* you can print to, no matter where your business takes you. This is much cheaper and more convenient than gallivanting across the country with an expensive portable printer.

Then Again, Maybe Not

So sure, there are good reasons for using a dot-matrix printer — but then again, there were once good reasons for eating eggs and bacon every morning. Here are some of the drawbacks to dot-matrix printing:

Slowness. Even at top speed, a dot-matrix printer can take more than two minutes to print a single page. When it's in high-quality mode, you can pretty much go out for pancakes while you wait.

Poorer Print Quality. A dot-matrix printer can't lay down a dot in a specific location with the precision that a laser or inkjet printer can, so its output at a similar resolution is usually fuzzier. A top-quality dot-matrix printer can generate output approaching that of a StyleWriter's, but if high print clarity is an absolute must, you'll probably be happier with an inkjet or laser printer.

Noise. No kidding, they're as noisy as an owl caught in an electrified fence — something to consider if you work near other people.

Spending Some Money

If you're buying a dot-matrix printer rather than connecting to one that's already on hand, you'll find many models to choose from. The most important feature to consider is print quality. Fortunately, this simply means choosing between a 24-pin and a 9-pin print head. A 24-pin printer can achieve a maximum resolution of about 360 dots per inch, offering near-laser-quality printing for $250 to $300. For those who want to spend less than $200, 9-pin printers with the same resolution as the original ImageWriter (about 160 dpi) are still widely available.

The other three important features to look for (in order of importance) are Epson compatibility, speed, and a commodious print buffer. Epson compatibility is a widely supported standard for sending commands to a dot-matrix printer. If you insist on an Epson-compatible printer, you'll have your choice of third-party hardware and drivers for using the printer with your Macintosh. As for speed, you will generally see it specified in *cps*, which indicates the number of characters per second the machine can print in its lowest-quality print mode. 24-pin printers offer the highest speed, typically 200 cps or better; a 9-pin unit might creak along at 150 cps or so.

The printer's buffer size also affects speed. The larger the buffer, the less your Macintosh has to wait when it's sending data to the printer. A 1K buffer is enough to hold almost a full page of plain text, but it's practically worthless with a Mac. Because the Macintosh sends a dot-by-dot image of the page, rather than text characters, a buffer of 16K, 32K, or even more is desirable.

You may also want to look for a printer that offers special paper-handling features. Paper-feeding options generally include tractor or friction feeders, with multiple paper paths and sheet feeders also available in some cases. For printing on wide forms, most dot-matrix printers are available in wide-carriage models.

Some of the best values in dot-matrix



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printers are put together by Epson and Panasonic. Panasonic offers two very affordable printers, the 9-pin KX-P1180i and the 24-pin KX-P1124i; both are sturdy machines for the budget-conscious. If you don't mind spending a little more money for some extra speed, Epson's LQ-570 is a spiffy choice for 24-pin printing on a middle-class budget.

Bridging the Gap

So here you are with your Macintosh and your Epson-compatible dot-matrix printer, eyeing the rest of this article warily. Not to worry; the technological gulf in this case is agreeably narrow, thanks to the commercial interface kits available.

These kits have to solve two problems. First, the interfaces of the Mac and the printer are absolutely incompatible as is. The Mac's printer port is a serial interface, whereas the printer's connector is parallel (serial dot-matrix printers are practically nonexistent, and they generally cost more than a parallel printer with an interface kit). Any hookup solution must include a special cable that takes the Mac's serial output and translates it into parallel. The second thing you need is a printer driver that works with your printer. When you buy your Mac, it includes only drivers for Apple printers such as the ImageWriter and the ImageWriter LQ.

Orange Micro's Grappler cartridges (Grappler IIsp for 24-pin printers and Grappler 9 Pin for the you-know-whats) make the assumption that you're printing

It's The Real Thing — Almost

If you're uncomfortable with the idea of buying a dot-matrix printer that isn't sold in a Macintosh-ready configuration, you still have a few options other than an ImageWriter.

The 9-pin Seikosha SP-2400AP Personal Printer is compatible with the ImageWriter, uses the same cables and drivers, and costs only half as much. For its $349 list price, you can buy a much sturdier IBM printer and interface cable, but it's a popular printer for the faint of heart. Seikosha, 10 Industrial Avenue, Mahwah, NJ 07430; 800-338-2609 or 201-327-7227.

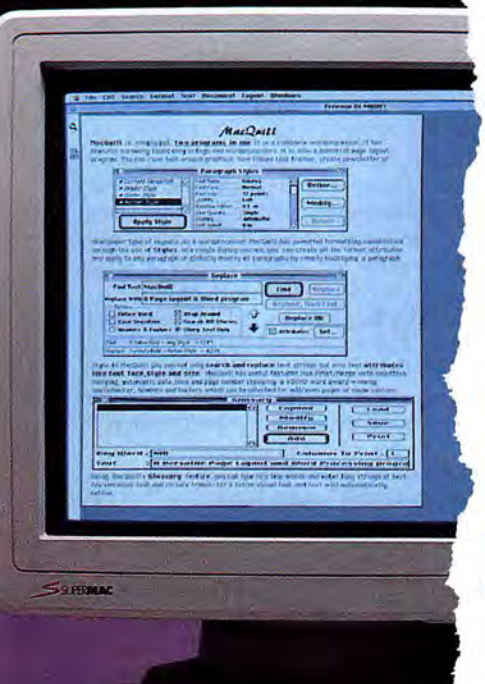
GCC's WriteImpact isn't ImageWriter-compatible, but with its own custom driver, it's as convenient to set up and use as anything made by Apple. At a list price of $599, it's like buying an ImageWriter II with twice the print quality at the same price — plus, you get free envelope-printing and spooling software.

And, unlike Apple, GCC makes a printer that will run on four C batteries. The WriteMove ($499), about the same size as a PowerBook and weighing in at a little less, makes it possible for you to fire up your PowerBook at the first sign of engine trouble and have a completed will and testament printed out and ready for your signature before your plane slams into the ocean. GCC Technologies, Inc., 580 Winter Street, Waltham, MA 02154; 800-422-7777 or 617-890-0880.

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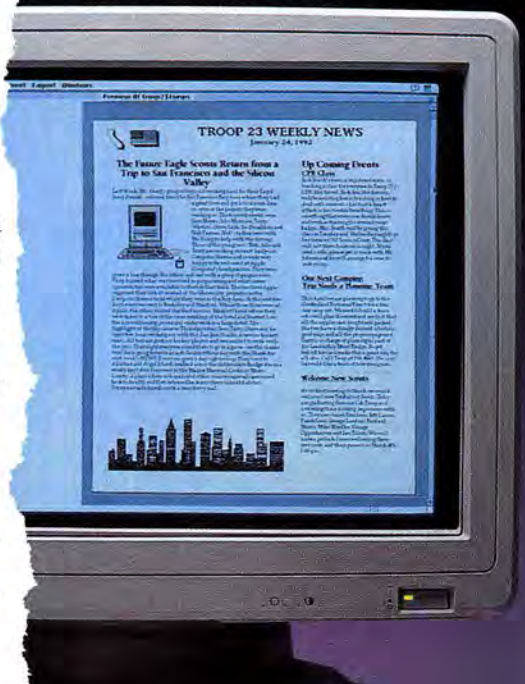


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Figure 2: In addition to letting you connect to an IBM dot-matrix printer in your office, the Grappler and the PowerPrint make great PowerBook companions. You can connect to IBM-compatible dot-matrix, inkjet, and laser printers wherever you go.

to an ImageWriter. They're special cables that not only transmogrify serial signals to parallel but also translate ImageWriter-specific printing commands to the native print codes used by your non-Apple printer. As a result, you can use Apple's standard ImageWriter and ImageWriter LQ print drivers and none of your applications will know the difference.

GDT Softworks' PowerPrint takes a different approach. In addition to the requisite serial/parallel conversion cable, you get an impressive collection of Chooser-level print drivers that allow Macintosh applications to use just about any printer. Because each driver is tailor-made for a specific type of printer, GDT's drivers can take advantage of features specific to that printer such as color printing, multiple paper sources, and so on. But the big advantage of the PowerPrint drivers is how much *better* they are than Apple's standard-issue ImageWriter drivers (see Figure 1). They let you choose to print only the document's odd or even pages, scale the printed image to any percentage, and define new paper sizes on the fly.

Which one should you buy? The aforementioned advantages of PowerPrint's drivers make it more attractive than the Grappler, but there are a few other things for you to consider before whipping out the ol' MasterCard. First, keep in mind that the standard ImageWriter drivers used by the Grappler are *industry* standard; it's always possible that you might run across an application that just plain doesn't like PowerPrint's custom drivers. PowerPrint drivers are also tightly licensed software. If you put a printer on a network (see the "Sharing the Dot-Matrix Delights" sidebar), you'll have to buy a copy of PowerPrint for every Mac that's going to be using that printer. The ImageWriter drivers used by the Grappler, on the other hand, can simply be duplicated for free — and the GrapplerShare software included with the Grappler provides a free, if rather slow, means of sharing the printer over a network. To share the printer over a network without increased costs, you may want to go with the Grappler.

If you want to look at every Mac-to-dot-matrix-printer product available, you can also check out ICD's Graflex cartridge, which converts serial-to-parallel output and offers ImageWriter compatibility. It works just fine but offers none of the extra goodies that you get with PowerPrint or Grappler, and at street prices, it doesn't cost much less.

Both the Grappler and the PowerPrint have a nifty additional benefit: They work with IBM-type inkjet and laser printers too, so when the time comes to take a step up in print quality, you can take your pick of dozens of cheap printers. And as we mentioned, both make excellent accessories for a PowerBook (see Figure 2). Having a Grappler or a PowerPrint in your

pocket means that no matter where you go, there'll probably be *some* sort of printer you can print to.

You Want PostScript Too?

Before you get too excited about joining the dot-matrix world, there's one more wrinkle to consider: No dot-matrix printer has PostScript built in, as many laser printers do. With both the Grappler and the PowerPrint, you can use ATM and TrueType outline fonts as well as QuickDraw graphics. (Both products also come with some bonus fonts, but the Grappler's are not-especially-necessary outline fonts and the PowerPrint's are just on-screen representations of the fonts built in to certain NEC and Toshiba printers.) However, the differences between QuickDraw and a high-octane page-description language will become apparent when you try to print from Adobe Illustrator and find that all your nifty text-mangling effects have disappeared.

Fortunately, there's a cheap solution. Freedom Of Press Light ($149), from Custom Applications (800-873-4367 or 508-667-8585), is a PostScript-compatible interpreter that runs on your Mac and lets any connected QuickDraw printer emulate PostScript. Freedom Of Press Light's print spooler appears as a standard LaserWriter in the Chooser, so printing involves no major life-style changes. However, the Mac winds up doing all those tricky PostScript calculations normally handled by the printer, so all your applications will slow down quite a bit while Freedom Of Press Light prints a document in the background. Otherwise, in form and function, it's almost exactly like printing a file to a LaserWriter. TScript Basic ($85), from TeleTypesetting (617-734-9700), brings largely the same PostScript functions to your dot-matrix printer but with a slightly different set of extra features. Unlike Freedom Of Press Light, TScript Basic can preview a PostScript image before printing and convert PostScript output to a TIFF file, but it lacks the networking features of Freedom Of Press Light (see the "Sharing the Dot-Matrix Delights" sidebar).

Dot, Dot, Dot

We'd all love to have a LaserWriter of our very own, but those of us forced to look elsewhere by budget restrictions or special printing needs can find good deals in the world of IBM-compatible dot-matrix printers. And once we're equipped with a device that lets us print from our Macs to IBM-compatible printers, such as the Grappler or the PowerPrint, we're on the road to . . . well, to anywhere we can carry our Macs.

After three weeks of working with dot-matrix printers, contributing editor Andy Ihnatko hopes that his hearing will return sometime soon.

Sharing the Dot-Matrix Delights

Let's say that you want to share the special capabilities of your dot-matrix printer with other users on your network. Because the printer plugs in to your Mac via a standard serial connection rather than as a LocalTalk device, you can't gracefully share it over a network. There are several workarounds, Shiva's NetSerial ($399) being the most elegant. It's really just a box with an AppleTalk connector and a Mac-type serial connector; you plug the NetSerial in to your AppleTalk network and then plug a serial device in to the NetSerial. With a special control panel and Chooser device installed, every Mac on the network can use the device.

There are also some less expensive software solutions. The Grappler IIsp interface kit for serial printers comes with its own GrapplerShare software, which allows network users to use your printer through your Mac's LocalTalk port — although your Mac will slow down most shamefully as it routes incoming requests to the printer. If you don't have the Grappler, Gizmo Technologies' ShadowWriter ($109) and HayesConnect ($79) perform largely the same function, but HayesConnect provides extra network-management tools for less money. Freedom Of Press Light provides a similar capability; you can configure its print spooler to appear as a LaserWriter to all other Macs on your network, allowing everyone to share your serial printer. The only catch is that Freedom Of Press Light can print to a dot-matrix printer in the background only if it's an ImageWriter or ImageWriter LQ; if you're using a PowerPrint driver, you'll have to set aside your Mac as a dedicated print server.

Gizmo Technologies Corp., P.O. Box 14177, Fremont, CA 94539; 510-623-7899.

Hayes Microcomputer Products, Inc., 705 Westech Drive, Norcross, GA 30092; 404-449-8791.

Shiva Corp., 1 Cambridge Center, Cambridge, MA 02142; 800-458-3550 or 617-252-6500.



Table 1: Mac/Dot-Matrix Printer Interface Kits

	GDT Softworks PowerPrint ★★★★	ICD Graflex ★★½	Orange Micro Grappler IIsp ★★★½	Orange Micro Grappler 9 Pin ★★½
List price	$149	$99.95	$159	$129
Pros	Custom print drivers for individual printers have more features than Apple's ImageWriter LQ driver. Print driver is all that's needed (no control panels). Also compatible with inkjet and laser printers.	Emulates ImageWriter LQ for maximum compatibility.	Emulates ImageWriter LQ for maximum compatibility. Network and spooling software included. In networks, you can add users at no additional cost. Also compatible with inkjet and laser printers.	Emulates ImageWriter for maximum compatibility. A new version with network and spooling software should be out by the time you read this.
Cons	No network software. In networks, each Mac must have a registered copy to use the networked printer.	Lacks the special features of custom drivers. No inkjet or laser-printer compatibility. No network software.	Lacks the special features of custom drivers. Uses a control panel as well as the somewhat quirky LQ driver.	Lacks the special features of custom drivers. No inkjet or laser-printer compatibility. No network software.
Company	GDT Softworks, Inc. P.O. Box 1865 Point Roberts, WA 98281 604-291-9121	ICD, Inc. 1220 Rock St. Rockford, IL 61101 815-968-2228	Orange Micro, Inc. 1400 N. Lakeview Ave. Anaheim, CA 92807 714-779-2772	Orange Micro, Inc. 1400 N. Lakeview Ave. Anaheim, CA 92807 714-779-2772



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Tim Garcia, President
Gateway Area Macintosh Users Group
St. Louis, Missouri

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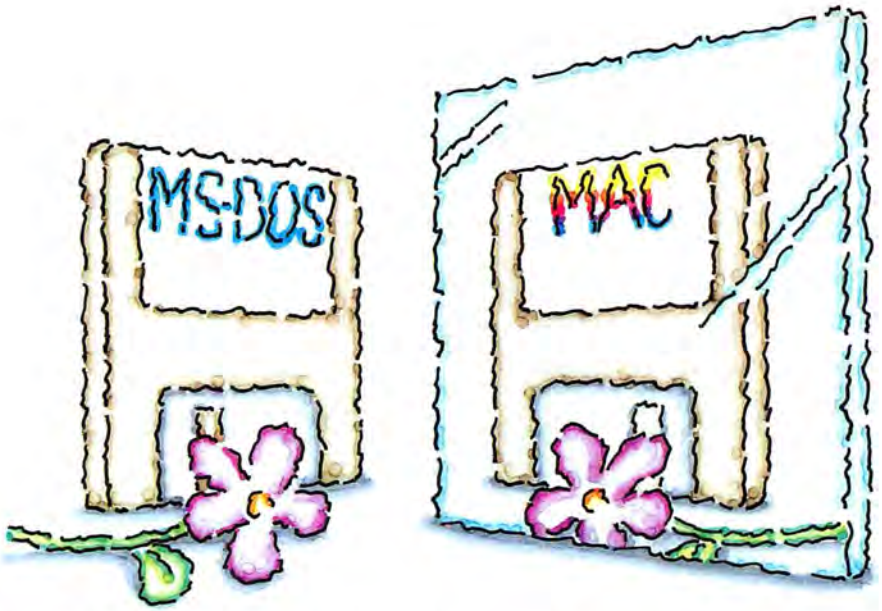
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CIRCLE 153 ON READER SERVICE CARD.

Back in August '91, *MacUser* columnist Michael Swaine predicted that X-rated videos would be what made digital video pay off commercially (see "America's Home Video," page 45). Swaine reasoned that "a genre in which production quality and artistic merit are superfluous can put a lot of product into the pipeline awfully quickly." That prediction has taken a first step toward reality with *House of Dreams,* the first X-rated QuickTime CD-ROM movie, from Digital Ecstasy. Yes, it's a 77-minute X-rated movie. You were expecting *Citizen Kane,* maybe?

By James Bradbury



Don't get caught shorted: Like many other consumer products (such as video cameras and cellular phones), Apple's PowerBooks come with battery packs that have exposed terminals. Accidentally shorting them (by storing spare batteries in the same carrying case as a leaky can of Diet Pepsi, for example) could result in anything from a ruined battery to a fire. Although the risk of such disasters is slight, Apple has decided to provide **free protective battery cases to PowerBook users,** just to be on the safe side. For information, call 800-377-4127 (outside the U.S., contact your local service provider).

Making dates: The PIM scheduler field has seen lots of new players, but an old favorite has shipped a new version as well. AgentDA, from Team Building Technologies (514-278-3010), features a **well-thought-out interface,** System 7 compatibility, and the ability to simultaneously open multiple calendars. Users without a lot of RAM will also appreciate that it needs only 140K of memory. $129 (additional user packs are $50 each).



Speaking in tongues: Want to learn a foreign language? Here are some software packages that could have you ordering fancy meals in Spanish, French, German, or Italian: **Picture It,** from Penton Overseas (619-431-0060), is a $69.95 set of computer flash cards. Each version teaches more than 500 words, complete with illustrations and audio pronunciations. ♠ For the more ambitious linguist, HyperGlot (800-726-5087 or 615-558-8270) offers **Berlitz Think & Talk,** a 50-lesson, 1,000-plus-word course on six to eight CD-ROMs, for $199. ♠ For linguists with **literary aspirations:** Transparent Language, from Transparent Language, Inc. (800-752-1767 or 603-465-2230), teaches reading comprehension by letting users read short works of foreign literature on their Mac, with translations, notes, and contextual information only a mouse click away. Each work comes with an audiocassette that provides pronunciation and listening-comprehension practice. The introductory package with samples (in Spanish, French, German, and Latin) costs $115.

Not just for fun: Kids who are learning to read English (and parents dreading that **100th reading of a favorite story**) will appreciate Just Grandma and Me, the first Living Book from Brøderbund (415-382-4400). The beautiful color graphics, sound, and interactivity on this CD-ROM storybook are in a class by themselves. As an added bonus for preschool linguists, Japanese and Spanish versions are included. No retail price was set at press time, but expect to pay between $39.95 and $54.95.



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The Well-Read Mac

If you had room on your shelf for only four Mac books, which ones would make the grade?

By Steven Bobker



The world has somewhere between 8 and 12 times as many DOS computers as Macs. That ratio hasn't changed much in years. Even the recent trend toward less expensive Macs has had little effect.

Although Apple's still having difficulty gaining CPU market share, Macs have made spectacular gains in one area: books — books about the Mac, about its workings, and about its software. The number of Mac titles has ballooned from 2 in early 1984 to a huge and constantly increasing number today. My local bookstore, which carries a reasonable number of computer books, now stocks 1 Mac-related book for every 3 or 4 DOS-related books. The last time I checked, there were 12 books on System 7 basics alone.

Then and Now

Back in 1984, Mac readers had two choices. Doug Clapp's *Macintosh Complete* is a very personal account of the early Macs and a general history and philosophy of personal computing. It's a wonderful book. Unfortunately, it went out of print almost as soon as it was published, but it's still worth reading today if you can find a copy (and how many eight-year-old computer books can you say that about?).

The other book, Cary Lu's *The Apple Macintosh Book,* was many people's first Mac textbook. It was better written than Apple's first Mac manuals and contained a lot more useful information.

Those first Mac authors are still writing: Doug Clapp is finally bringing out his second book on Macs. Like the first, it's sure to be eclectic and interesting.

The fourth edition of Cary Lu's *The Apple Macintosh Book* (1-55615-278-7, Microsoft Press, $24.95) was published just before this issue went to press. (Note: Instead of the usual retail price and phone number, this column provides the ISBN [International Standard Book Number], in case you want your book seller to order the book; the publisher; and the suggested U.S. retail price.) The new edition retains the same squarish format, elegant and easy-to-read design, and wonderful mix of Macintosh and general computer knowledge. What's more, it's printed on recycled paper. The information is up-to-date as of January 1992, and coverage ranges from absolute beginner to just below power user. Several software programs get a brief mention, but the book's greatest strength is its wealth of information on Mac operational details. *The Apple Macintosh Book* delves deeply into the subject, but it always remains understandable — definitely a book for every Macintosh library. If you return the included card, you'll get a free update in the first half of 1993.

The Deluge

The number of Macintosh books I receive every week has prompted more than one uncomplimentary comment from my mail carrier. It's impossible to read all the books

printed in the past year — or even the past month — with care. There's simply not enough time. I do look at them all, though, and read at least part of each one. Here are two of the conclusions I've reached: (1) There are few really great Mac books available, but there are some. (2) My mail carrier has a valid complaint. Most of these books are unnecessary or have very small, specialized markets; a disproportionately large number are turkeys.

What follows is a rundown of the best Mac books I've read, with a few warnings tossed in about what to avoid. My goal is to give you a list on which you can base a good, solid Mac library.

For the most part, I've stuck to general Mac books and to books about the Mac's system software, programming, and related issues — omitting application-specific books. You can write to me at *MacUser* (or electronically on ZiffNet/Mac at 72511,45) and tell me what other books you like and why. If there's enough interest, I'll write a follow-up column.

Along with Cary Lu's book, there are three other essential Mac books. The first is Guy Kawasaki's *The Macintosh Way* (0-673-46175-0, Scott, Foresman, $19.95; also available in paperback). No other book comes close to this classic in explaining what the Macintosh really is, how it got that way, and how it can stay that way. It's a wonderful book.

The other two essential books have an operational nature. They're guides to getting started and becoming a productive and powerful user. My absolute favorite book is Bob LeVitus' *Dr. Macintosh: How to Become a Macintosh Power User*, second edition (0-201-57070-5, Addison-Wesley, $24.95). Bob, a regular in these pages, is as good at explaining details as anyone I know. He writes so well that learning complex, demanding material becomes a pleasure. The tone of the book is conversational, and it's packed with valuable tips.

The second great operational book is *Danny Goodman's Macintosh Handbook* (0-553-35485-X, Bantam, $29.95), written by Goodman and Richard Saul Wurman. Wurman is the creator of the highly honored Access series of travel guides, so it's no surprise that this book is laid out like those famous publications, with bold graphics and large areas of color that provide organization. The book is absolutely up-to-date and makes an excellent desktop reference. Its episodic and graphic structure isn't conducive to extensive reading but does make finding topics easy, and the quality of the information is very high. However, the first release of the book is flawed by bad printing on cheap-feeling paper (apparently there was a rush to get it out), and the power-user tips, in small white type on a black background, are difficult to read.

Two books that almost make the list are *The Macintosh Companion* (0-201-57754-2, Addison-Wesley, $22.95), by Sharon Zardetto Aker, and *The Little Mac*

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GREAT VALUE MVP

CIRCLE 75 ON READER SERVICE CARD.

Book, second edition (0-938151-68-1, Peachpit Press, $14.95), by Robin Williams and Kay Nelson. *The Macintosh Companion* is excellent for beginners and users who are considering buying their first Macintosh (these users should also get Cary Lu's book). It won't take you as far as the Big Three, but it will certainly get you started. *The Little Mac Book* provides a good overview of Mac operations. It's more of a taste than a meal, but it's a very nice taste.

Far too many books are devoted to the topic of System 7, and many were rushed to press. None of them is great, and you can get by without any of them. All the recent, more general books cover System 7 in detail and do it better than the standalone books do.

ResEdit Complete's excellent explanations and detailed procedures can get readers started well in the joyous art of ResEdit hacking.

There are three good books about ResEdit and MacsBug. Although both applications were written for programmers and are often considered exclusively to be programmer's tools, ResEdit and MacsBug are very handy for advanced users and are not at all dangerous when used properly.

The best ResEdit book is *ResEdit Complete* (0-201-55075-X, Addison-Wesley, $29.95 with disk), by Peter Alley and Carolyn Strange. The disk has a copy of ResEdit, but it's not likely to be the latest version (the latest version of ResEdit is readily obtainable from bulletin-board services and user groups). This book is full of excellent explanations of how ResEdit works, and its detailed procedures can get readers started well in the joyous art of ResEdit hacking.

The other ResEdit book is *Zen and the Art of Resource Editing* (0-938151-75-4, Peachpit Press, $24.95), edited by Derrick Schneider, Hans Hansen, and Noah Potkin. This book is a good, safe way to get started with ResEdit. It's not as thorough as *ResEdit Complete,* but it's quite a bit friendlier.

Take my advice and stay away from the official Apple/Addison-Wesley guide to ResEdit, because it's inferior to these books and is overpriced, as well.

The official *MacsBug Reference and Debugging Guide* (0-201-56767-9, Addison-Wesley, $22.95), on the other hand, is excellent. The book includes an explanation of a complicated but useful programmer's tool in a form that makes it accessible to all readers. Good stuff.

Finally, let me mention one book that owners of older Macs might find useful: *The Dead Mac Scrolls* (0-940235-25-0, Goldstein & Blair, $32), by Larry Pina.

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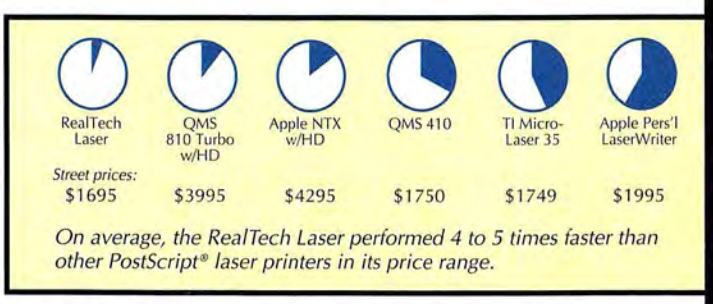
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CIRCLE 85 ON READER SERVICE CARD.

DARE TO COMPARE.



On average, the RealTech Laser performed 4 to 5 times faster than other PostScript® laser printers in its price range.

WINNER
MacWEEK
1991
TARGET AWARD

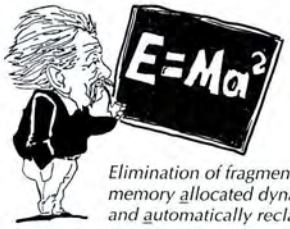


Visibly faster.

The RealTech laser printers' high performance Weitek RISC processor prints complex documents 4 to 5 times faster than other non-RISC laser writers in their price range. ATM font rendering technology builds raw type characters 4 to 5 times faster. The RealTech uses a new version of the Sharp printer engine that prints 9 pages per minute.

Based on Adobe PostScript® Level 2...

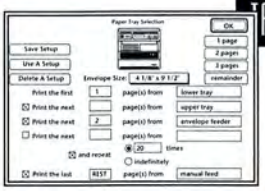
the next generation of Adobe's page description language, which has become the industry standard for defining pages of integrated text and graphics. It contains a number of performance, function and print quality enhancements that save printing time and improve quality. PostScript® Level 2 is compatible with all current application software that supports the PostScript® language. In addition, PostScript® Level 2 offers new capabilities, including forms handling, graphic patterns support, and new half-tone algorithms.



Elimination of fragmentation = memory allocated dynamically and automatically reclaimed

Genius-level memory.

One pool of memory is available for all resource needs. Memory is dynamically allocated and automatically reclaimed; no arbitrary memory restrictions exist. Disk space management is improved to eliminate fragmentation and improve transfer of information from the hard disk to RAM.



You can specify up to 4 paper changes from the menu — without ever leaving your chair!

The multi-user printer!

An ideal choice for multi-user printing environments. Second 250-sheet cassette feeder is available ($299); optional envelope feeder available for RealTech Laser only.

RealTech™ Laser

$1695

Lease price: $47/month

NEW LOWER PRICE!
We've sold so many of these award-winning printers that our manufacturing costs went down...so ***we're passing the savings on to you!***

500% FASTER than non-RISC printers

- *RISC processor*
- *SCSI port*
- *9 pages/minute*
- *PostScript Level 2*

HOW REALTECH STACKS UP

PERSONAL LASER PRINTERS

	RealTech Laser	Apple LaserWriter IINTR	NEC Model 95	TI microLaser Turbo	GCC BLP IIs
Price	$1695	$2195	$1749	$2249	$2499
Pros	Weitek RISC processor	Am29005 RISC processor	Motorola 68000	Weitek RISC processor	Motorola 68000
	9 ppm 8.5x11	4 ppm 8.5x11	6 ppm 8.5x11	9 ppm 8.5x11	8 ppm 8.5x11
	Optional 2nd paper tray	—	—	Optional 2nd paper tray	Optional 2nd tray
	300 dpi	300 dpi	300 dpi	300 dpi	300 dpi
	SCSI port	—	—	Optional SCSI port	SCSI port
	2 mb RAM (+8)	3 mb (+1)	2 mb (+3)	2.5 mb (+8)	2 mb (+2)
	PostScript Level 2	PS Level 2	PS Level 2	PS Level 2	PS Level 1
Cons	Only available through HARDWARE THAT FITS 1-800-972-3018	No SCSI port 4 ppm Only expandable to 4 mb RAM No 2nd paper tray	No SCSI port 6 ppm Only expandable to 5 mb RAM No 2nd paper tray	Expensive options Daughter board design Upgradable to 10.5 mb, but not all memory usable for PS	Pricey 8 ppm Only expandable to 2 mb RAM
	Optional env. feeder $269 *Optional 2nd paper tray $299*				*Optional 2nd paper tray*

HARDWARE THAT FITS

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Conroe, Texas
77301

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All prices are subject to change without notice.



TI MicroLaser Plus.

300 dpi, HP LaserJet Series II emulation standard. 1.5 Mb RAM. 9 pgs./minute; 17 resident fonts; 3,000 pgs./month duty cycle. Optional accessories: 2nd paper tray, separate envelope tray.

Lease: $34/mo. **$1249**

TI MicroLaser XL Turbo. *Prints 16 pages/minute!*

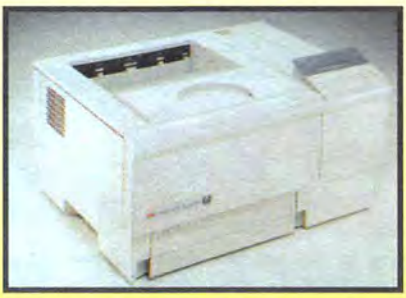
300 dpi with Adobe PostScript Level 2 and RISC-based processor. 2.5 Mb RAM. 16 pages per minute; 35 resident fonts; 25,000 pages per month duty cycle. Optional 2nd paper tray and SCSI interface.

TEXAS INSTRUMENTS
$3299
Lease: $91/mo.

***TI MicroLaser Turbo*..... $1939** **Lease: $53/mo.**

NEC Silentwriter Model 95

$1469
Lease price: $40/month



Micro-fine toner and NEC's patented "Sharp Edge" technology gives you sharp, black print quality.

300 dpi laser printer prints 6 ppm. 2 Mb RAM, expandable to 8 Mb. Built-in envelope feeder and 250-sheet tray; feed or print consecutively or alternately. Resident language: Adobe PostScript Level 2. Automatic emulation switching.



$4495
Lease: $123/mo.

Seiko Instruments ColorPoint PSX

$6795
Lease: $186/mo.

It's fast! Prints on roll-fed paper or roll-fed transparency to within 1/4" border on all sides, ensuring that the full-color image is printed without reducing the image size. 300 dpi color thermal printer uses 25 MHz RISC processor. 6 Mb RAM standard, upgradable to 34 Mb. Adobe PostScript® language compatible. Download, process and print images simultaneously; it has multiple frame buffers. Includes three interfaces as standard: AppleTalk, Centronics, and RS-232, plus a SCSI port, allowing users to share the ColorPoint among Macs, PCs, workstations, or a network. The printer continuously polls all interfaces and re-configures automatically to receive incoming data. 39 resident fonts.

Seiko Instruments ColorPoint PS. Same specifications as the PSX, but with a 16 MHz processor. 6 Mb of RAM standard, upgradable to 34 Mb.

$5295
Lease: $148/mo.

Seiko Instruments Personal ColorPoint PS

High quality color! 300 dpi color thermal printer can produce full-bleed comps on plain paper or transparencies. B4 page size allows printed image of 8.53" x 11.93". 6 Mb RAM upgradable to 10 or 22 Mb. 39 resident fonts, 16 MHz RISC processor.

Seiko Instruments Smart Label Printer Plus

$175



Can print bar-coded labels. Takes less desk space than a Rolodex® file. Prints labels for envelopes, file folders, diskettes, notebook covers, file cards, name tags, and more. Bar-coding capability makes it useful for tagging low-volume inventory. Includes software (with its own database, text editor and bar-code generator), serial cable and 130 self-adhesive labels.

CoStar Label Printers

***AddressWriter*..... $469**
***LabelWriter II*..... $189**

HARDWARE THAT FITS

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FAX: 1-409-539-4141
Call: 1-409-760-2400



RealTech laser printers come out on top in performance, features, AND price, every time.

$4495

Lease price: $123/month

RealTech™ Laser 400

TWICE THE PRINTER!

400 dpi/ 11x17 printer

- **High-speed printing (15 ppm, letter size)**
- **8 ppm (tabloid size)**
- **2 paper trays included!**
- **SCSI port**
- **Edge-to-edge printing!**

The ideal networking printer.

The RealTech Laser's (and Laser 400's) three interface ports (Appletalk® RS-422, IBM PC parallel, and RS-232-C) can be used simultaneously. They can be assigned either PostScript® or LaserJet II emulation, making it the ideal network printer. It switches automatically between interfaces and emulations, and spools files on a real-time basis. A Hewlett Packard LaserJet Series II emulation allows use with non-PostScript applications software.

Prints edge-to-edge!*

No more tiling to get the full image area! The RealTech Laser 400 prints the entire page, not just to 1/4" from the edge.

**Prints edge-to-edge with 4 Mb expansion.*

SCSI port.

The standard configuration includes a SCSI port and 2 Mb of RAM upgradable to 10 Mb (RealTech Laser) or 4 Mb of RAM upgradable to 16 (RealTech Laser 400).

AGAINST THE COMPETITION

11x17 PRINTERS/HIGH-SPEED PRINTERS

	RealTech Laser	QMS 2210	Hewlett-Packard IIlsi
Price	**$4495**	**$8995**	**$6995**
Pros	Weitek RISC processor	Motorola 68020	RISC-based formatter
	8 ppm 11x17	11 ppm 11x17	
	15 ppm 8.5x11	22 ppm 8.5x11	17 ppm 8.5 x 11*
	2 paper trays	Optional 2nd paper tray*	2 paper trays
	300 or 400 dpi	300 dpi	300 dpi
	SCSI port	SCSI port	
	4 mb RAM upgradable to 16	4 mb RAM	5 mb RAM upgradable to 17 mb
	PostScript Level 2	PS Level 1	PS Level 1
Cons	Limited supply	Very expensive	Expensive
	until 4/92	Limited to 300 dpi	Limited to 300 dpi
	1-800-972-3018	Poor paper handling	No 11x17 output; no SCSI port
		Slow for complex graphics; 4 mb RAM maximum ** Optional paper tray $115*	** Optional double-sided printing costs $695; not practical for most applications*

Money-back guarantee.

RealTech laser printers are backed by a 1-year warranty. If you're not satisfied, we'll refund your purchase price, minus consumables.*

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—Your HTF Customer Service Team

I'm interested in these types of printers:
- ❑ laser printers
- ❑ color printers
- ❑ 11 x 17 printers

I'm interested in these types of scanners:
- ❑ color scanners
- ❑ 35mm slide scanners
- ❑ transparency scanners
- ❑ OCR scanners

I'm interested in these types of networks:
- ❑ Ethernet
- ❑ Wide Area Ñetworks (WAN)
- ❑ Local Area Networks (LAN)

❑ I'm interested in notebook computers.

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- **Priced LESS than the comparable Apple product.**
- **Backed by a minimum 1-year warranty and our 30-day money back guarantee.**

If you're not satisfied with what you buy from us, just call. We'll refund your purchase price (minus consumables, for printers).

** Before returning merchandise, we must ask that you call our Customer Service Dept. to receive a returned merchandise authorization number (RMA). This number must be included with any printer you return. No C.O.D. returns, please. NOTE: Our ads are created entirely on Macintosh systems, from concept to film. Call us for more information!"*

Mail in this card or call toll-free for your

FREE SAMPLE

of RealTech Laser Printer output

(Seeing is believing! We figure a real-life example in your hands is worth a thousand words.)

This is
300 dpi output

Shown at 100% (14 pt. Times Roman)

This is
400 dpi output

Shown at 100% (14 pt. Times Roman)

This
300 dpi

Enlarged at 200%

This
400 dpi

Enlarged at 200%

"Your RealTech Laser 400 has saved me an incredible amount of time and aggravation; the resolution makes our company newsletter look like it was output on a typesetter. And the fact that it prints 11x17 and I don't have to deal with those tiled pages anymore...what a relief! Thanks for offering such a great product."

—Debora Koontz
Riverword, Inc.

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Call today and we'll fax you a lease application.

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Printed on recycled paper to show our concern for the environment.

Full bleed...full color...11x17!



The color output shown above is an Aldus Freehand sample file.

Only $5995!

Lease price: $165/month

Real Tech™ Color 350

Where else would you find such a high-quality, affordable color printer?

High-speed thermal printer produces edge-to-edge comps on 11x17 or smaller paper...

300 dpi thermal transfer technology prints quality color or monochrome output. 10 Mb standard; upgradable to 18 or 34 Mb. Three interface ports (RS-232, parallel, and Appletalk) can be used simultaneously. Includes 39 resident Bitstream fonts.

Brilliant, saturated color at 300 dpi

Adobe PostScript® compatible...perfect for graphic arts applications, publishing, business presentation graphics, and more. 4 scanning passes; Pantone-approved color palette. Includes printer tray and sheet feeder.

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Prints on BOTH sides of thermal or plain laser paper!*

- Easy-access front control panel
- 300 dpi
- 10 Mb of RAM
- SCSI port
- Largest "live" image area of any cut-sheet printer

* The RealTech Color 350 uses state-of-the-art thermal technology, which allows you to print on both sides of thermal paper, or on both sides of high-quality, smooth finish plain laser paper. (Use thermal paper or clay-coated paper for optimum output quality and consistency.) Call for more information.

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CIRCLE 198 ON READER SERVICE CARD.

In addition to having the best title of any Mac book, *The Dead Mac Scrolls* offers excellent directions on how to repair older Macs and printers. Despite what its cover and publicity might lead you to think, however, the book doesn't cover newer units (starting roughly with the IIcx). Actually, I don't know of any book that adequately covers the repair and servicing of the Mac models that were released within the past three years. On the other hand, older Macs are the units that are most likely to need fixing.

Pick of the Month

Panorama Direct (ProVUE, $99.95; 800-966-7878 or 714-892-8199) is a subset of the excellent Panorama 2.0 database program. It has almost everything the full-featured version has, with the exception of graphics creation and the ability to create macros (it can, however, run macros built by the full version). What you get for giving up some features is a great price and a relatively small package filled with database power.

Panorama has earned a reputation for great speed, because it works entirely in RAM. That means that your file sizes are limited by RAM, of course: In the 976K minimum partition, you can store 7,000 to 8,000 records. The application requires only 461K of disk space and creates small data files.

Data entry in Panorama is easier than in any other database program. Features such as Clairvoyance, which automatically finishes typing entries that it recognizes; AutoCapitalizing, with an obvious function; and Smart Dates, which lets you use dates such as "last Saturday" and "next Monday," are a pleasure to use when you must accurately enter quantities of data. Panorama Direct's small size and infrequent need to access (and wake up) your hard drive make it a great PowerBook tool.

Road Tips

Battery life is a major topic of discussion when PowerBook users gather. I get nearly three hours per charge on PeeBee, my PowerBook 140 with 8 megabytes of RAM and an 80-megabyte hard drive with modem; friends with similar PowerBook 140s with 4 megabytes of RAM and 40-megabyte hard drives tell me that they rarely get two hours per charge. Although there are several variables to consider, many users still don't know how to maximize their battery's use per charge.

Adding memory and using bigger hard drives and modems decrease the use per charge. Each of these things draws small amounts of power, so the drop should also be small, even if you add all three items at once. A dramatic drop in battery life may mean a defective component or a bad installation. Have your dealer check out those possibilities.

You also need to really charge the battery. You can fill all the squares in the Battery DA in two or three hours, but that's not a full charge. A full charge takes at least seven or eight hours. If you rely on the Battery DA's readings, you'll run out of power very quickly.

The worst battery-life abuser is

How can I add a large screen to my Mac PowerBook?



ScuzzyGraph™ ...that's how!

ScuzzyGraph is the only display adapter that lets you instantly connect any monitor, monochrome or color, to any Mac, on your desktop or on the road.

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CIRCLE 110 ON READER SERVICE CARD.

AppleTalk, which can rob half an hour or more per charge: Turn it off when you're not using it. Train yourself to check the Chooser frequently to make sure it's off. When your PowerBook is running on battery power, turn the screen brightness down to just above Off. In bright sunlight, you might not even need backlighting. Try it, especially if you have the 170 model. These two steps should substantially increase time between recharges.

The third major power consumer is your hard drive. When it's spinning, it uses quite a bit of juice. (The hard drive's size doesn't really matter; just being on and spinning is a substantial drain.) Keep your drive off as much as possible. You can set automatic timed shutdowns by using the Portable control panel, but a much better solution is to use Billy Steinberg's SpinD Fkey (part of the PBTools package, which is available as PBTOOL.CPT in Library 3 of ZiffNet/Mac's Download & Support Forum). This easily installed Fkey shuts off the hard drive on demand. If you won't need your hard drive in the next 60 seconds or so, shut it off. (The 60-second rule is important, because starting up a hard drive is the action that consumes the most power, so you don't want to have to start up again unnecessarily.)

The worst battery-life abuser is AppleTalk, which can rob half an hour or more per charge: Turn it off when you're not using it.

If, after trying these tricks, you still can't work for more than 90 minutes per charge on your PowerBook, you may have a defective battery.

Eggs for the Mind

Both Microsoft Word 4.0 and Word 5.0 have Easter eggs. So far I've seen only the one in Word 4.0, but if anyone has found the Word 5.0 Easter egg, I'd like to hear about it. I believe it's associated with a menu command and has nothing to do with the About box, which is a semistandard location for burying Easter eggs.

Here's the Word 4.0 Easter egg, which *is* located in the About box. To view this Hollywood-style tribute to Word 4.0's production team, select About Microsoft Word from the top of the Apple menu. Position the cursor over the Word icon near the top left corner, hold down the Command key, and click the mouse button. The Word icon drops, and the lights come on. To end the show, simply click the mouse button again. On all the Macintoshes I've used to test this egg, the show eventually slows down but never quite stops.

Steven Bobker, a former editor-in-chief of *MacUser*, currently keeps busy acting as sysop for ZiffNet/Mac, *MacUser*'s on-line service, among other projects. He can be reached there at 72511,45 and welcomes all comments.



CIRCLE 125 ON READER SERVICE CARD.



How To Buy

CD-ROM Drives

The pundits who promised there'd be a CD-ROM drive on *almost* every desktop may soon be proved right. Sales of these read-only drives, which let you access discs that can contain more than 600 megabytes of information, are finally taking off, and prices are heading down, with some drives available for not much more than $400. Although performance is still sluggish in many cases, new standards are improving throughput. In addition, more and more Mac-specific CD-ROMs are becoming available. These discs are proving especially popular in professional settings, whether for training, reference, or storing such resources as graphics and clip art. If you're in the market for a CD-ROM drive, these pointers will head you toward the right one. For more information, see "Is It Time for CD-ROM?" June '91, page 150, and "Most Valuable Players," March '90, page 150.

By Victoria von Biel

✔ CD-ROM is an acronym for *compact disc read-only memory*. CD-ROMs look exactly like their audio counterparts, and in fact, you can play audio CDs on a CD-ROM drive.

✔ No, you can't hook up your CD player to your Mac and use it to read CD-ROMs. Unfortunately, CD players have much slower access times than do CD-ROM drives and lack the SCSI interface and error-correction circuitry necessary for computer use.

✔ Why are CD-ROM drives more expensive than CD players? Fewer CD-ROM drives are produced so they cost more to manufacture. They also use more-expensive components.

✔ Although you won't break any speed records with a CD-ROM drive, manufacturers have finally broken away from old standards that shackled performance. NEC now makes some drives that are showing faster throughput than was previously possible, and other manufacturers are sure to follow suit.

? Check out the audio software that comes with the CD-ROM drive. Usually in the form of a control panel or HyperCard stack, this software lets you play audio CDs on your drive when you're not using it to access data. Some programs let you do such things as create custom play lists and shuffle tracks.

? For the best-quality sound, make sure the drive has RCA preamp jacks that let you hook it up to external speakers; otherwise you're limited to the headphone jack.

? Check the volume control — you want something that will give you as much power as possible.

? If you'll be using the drive for specific purposes — to access Adobe Photoshop files, for example — test the drive with the software before you buy. You may find significant performance differences among drives.

$ Some manufacturers bundle free CDs with their drives, but don't let this blind you to the drive's quality — or lack of it.

? Dust is a CD-ROM drive's greatest enemy. If you're going to be working in a dirty environment (near an open window or in a room where people smoke, for example), check that the drive's door closes, thus protecting the mechanism.

? If the drive has a fan, don't assume that it will protect the mechanism from dust. Hold your hand in front of the fan to make sure that it's blowing air out, not sucking it in.

$ In the crucial fight against dust, drives with self-cleaning lenses are more reliable, but they're also more expensive.

? If you're using System 7, make sure the drive comes with a System 7 driver. Surprisingly, some manufacturers still aren't including this vital piece of software.

? Here's how to test a CD-ROM driver's reliability: Mount a disk, drag it into the trash, and then remount it. If the disk doesn't remount, the driver is questionable.



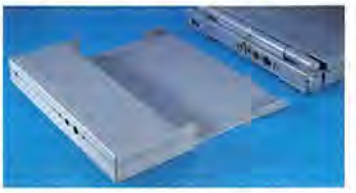


Good news for all you BBS aficionados: Finally, there's a one-stop solution for decompressing the most-popular compression formats, *and* it's free. StuffIt Expander, from Aladdin Software, decompresses all StuffIt, AppleLink, and Compactor Pro documents. Get it from your local user group or an on-line service such as CompuServe or America Online. To download StuffIt Expander from *MacUser*'s on-line service, ZiffNet/Mac, look for STUFEX.SEA in the Download & Support Forum's New Uploads library.

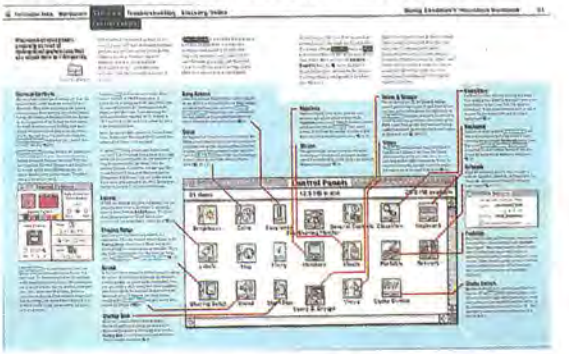
By Victoria von Biel



Say ahhh: Thinking of buying a new hard drive, monitor, or CPU? Along with your credit card, you might want to take a copy of **Maxa Snooper,** diagnostic software that performs benchmark tests, seeks out hardware ills, and does the kind of video tests that'll ensure you're getting the best buy for your money. There's a software-only version ($229) that works on any Mac from the Plus on up as well as a hardware/software combo ($299) that includes a NuBus card for diagnosing problems when all you get is that sad-Mac face on your screen. For the ultimate in Mac diagnostics, you can team Snooper with Teknosys' Help!, which finds software problems and incompatibilities. These two programs are bundled in one package from major mail-order outlets. No price was available at press time. 818-543-1300.



Plugged in: PowerBooks are great on the road, and they're not bad around the office either. But if you frequently connect your PowerBook to a hard drive, an ADB device, or a network, dealing with all those cables can be a drag. By letting you set up all the cables and connectors you'll be using in its base unit, BookEndz, from Pilot Technologies, helps you tame some of the chaos. When you're in the office, **just pop your PB into the unit and you're all hooked up;** when it's time to go, pull it out, and you're on your way. For the PowerBook 100, $149.95; for the PowerBook 140 or 170, $179.95. 612-949-2683. If you thought that Sophisticated Circuits' **PowerKey** was just an easy way for Mac Classic owners to turn on their machines without reaching behind the computer, think again. When combined with PowerKey Remote and AppleTalk Remote, PowerKey 2.0 lets PowerBook users access hard drives, modems, and other peripherals attached to the Mac back in their office. Download files, send faxes, peruse your E-mail — all from your PowerBook. PowerKey 2.0, $119; PowerKey Remote, $49. 206-485-7979.



Vacation reading? You might even want to take this one to the beach with you: HyperCard guru Danny Goodman and designer Richard Saul Wurman have teamed up to produce ***Danny Goodman's Macintosh Handbook Featuring System 7.*** Much of the information is presented visually, so you don't have to wade through pages of dry text to find what you're looking for. Even better, each part's divided into beginner, intermediate, and advanced sections, so you can skip the info you don't need. Bantam Computer Books, 212-492-9479. $29.95.

Working Parts

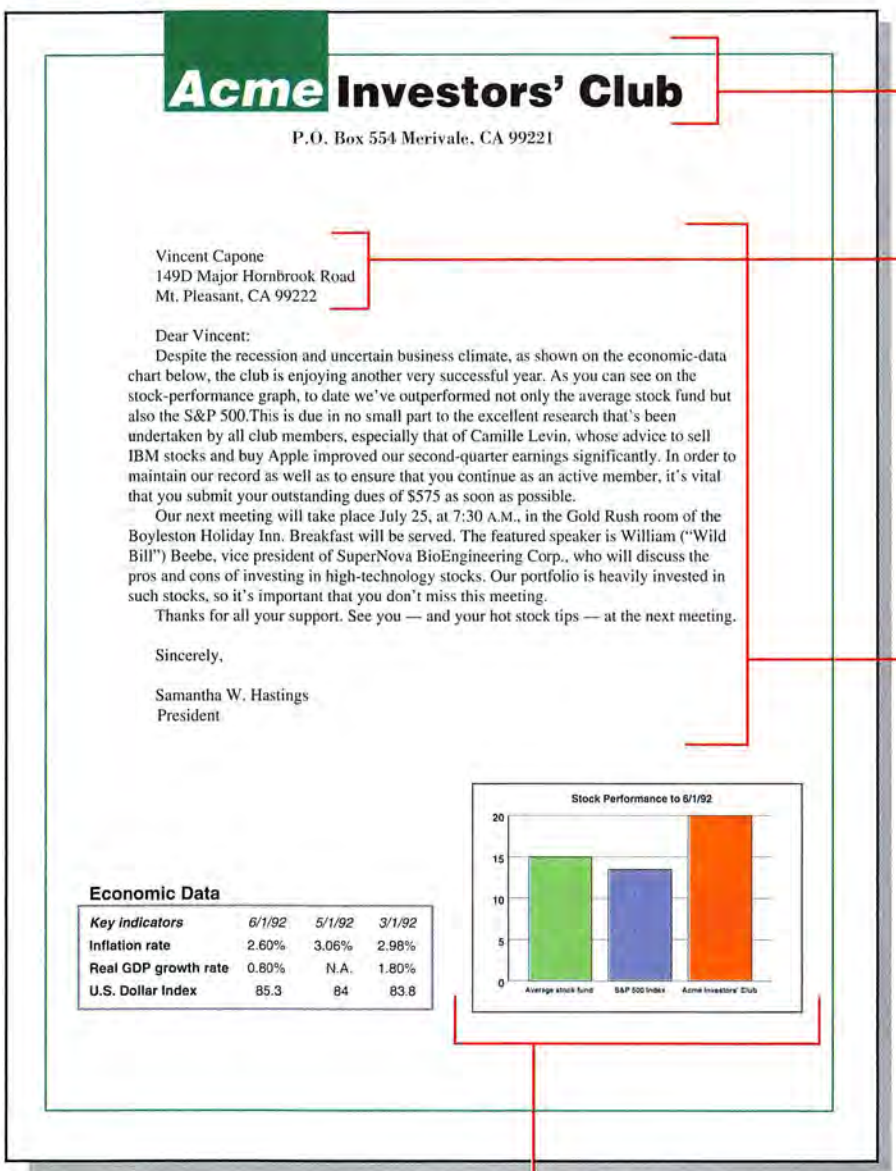
Are you in the market for an integrated program? Here's a quick guide to what makes these all-in-one packages tick.

By Laurie M. Love

By definition, an integrated product brings together several functions — word-processing, graphics, spreadsheet, database, telecommunications, and so on — into one product. Although programs such as Beagle Bros' BeagleWorks, ClarisWorks, or the soon-to-be released Microsoft Works 3.0 may not be hefty enough for all the work you need to do, they're good choices for users who are new to the Macintosh, experienced Mac users who just don't need all the bells and whistles that full-featured programs offer, and PowerBook owners who are looking for lots of power in a small package.

Most of the integrated packages now available can produce the letter shown at right, which includes a simple logo, text, a spreadsheet, and a chart, and takes advantage of mail-merge capabilities. What distinguishes one integrated product from another lies in the way you use the different functional areas together to accomplish the task. For reviews of the integrated packages now available, see "Swiss-Army Software," June '92, Buyer's Guide page 44.

Santa Cruz, California-based writer and editor Laurie M. Love is author of *Using ClarisWorks*, published by Addison-Wesley.



Acme Investors' Club

P.O. Box 554 Merivale, CA 99221

Vincent Capone
149D Major Hornbrook Road
Mt. Pleasant, CA 99222

Dear Vincent:

Despite the recession and uncertain business climate, as shown on the economic-data chart below, the club is enjoying another very successful year. As you can see on the stock-performance graph, to date we've outperformed not only the average stock fund but also the S&P 500.This is due in no small part to the excellent research that's been undertaken by all club members, especially that of Camille Levin, whose advice to sell IBM stocks and buy Apple improved our second-quarter earnings significantly. In order to maintain our record as well as to ensure that you continue as an active member, it's vital that you submit your outstanding dues of $575 as soon as possible.

Our next meeting will take place July 25, at 7:30 A.M., in the Gold Rush room of the Boyleston Holiday Inn. Breakfast will be served. The featured speaker is William ("Wild Bill") Beebe, vice president of SuperNova BioEngineering Corp., who will discuss the pros and cons of investing in high-technology stocks. Our portfolio is heavily invested in such stocks, so it's important that you don't miss this meeting.

Thanks for all your support. See you — and your hot stock tips — at the next meeting.

Sincerely,

Samantha W. Hastings
President

Economic Data

Key indicators	6/1/92	5/1/92	3/1/92
Inflation rate	2.60%	3.06%	2.98%
Real GDP growth rate	0.80%	N.A.	1.80%
U.S. Dollar Index	85.3	84	83.8

Charting

Most integrated programs include a charting capability. Although all charts are based on a selection of spreadsheet data, each product differs in the way you create charts and in the charting options available (see Figure 3). The easiest, most seamless way to create a chart is to select the data, choose a menu command (or press a keyboard equivalent), and see the chart appear on your screen. ClarisWorks and Microsoft Works 3.0 both follow this simple procedure, placing the chart in the document as a graphic object. In BeagleWorks, a dialog box appears before the program draws the chart, asking you to name the chart and specify its location on-disk. When the program has finished drawing it, the chart appears in a separate window as a draw document.

Mail-Merge

Mail-merge — in which data from the database module such as names and addresses, prices, or inventory information is automatically added to documents — fits naturally into integrated programs. In this example, mail-merge was used to add the address, greeting, and dues owed.

Most programs handle mail-merge the same way; they let you merge database information from an open database document into an open word-processing document. In ClarisWorks, however, you can merge database information into a text frame that can then be added to a spreadsheet or chart.

Word Processing

You probably wouldn't buy an integrated program to get such complex word-processing features as indexing or fancy formatting, but you may be surprised at the sophisticated features that are available. Most offer some advanced word-processing capabilities such as a thesaurus and macros. In addition, GreatWorks offers tab fills and multiple columns with variable widths, both Microsoft Works and ClarisWorks let you create footnotes, and ClarisWorks lets you link text frames (or spreadsheet frames) so that text flows from one frame to the next.

Tool Palette

The core of an integrated program is often its tool palette, which is where you find tools for drawing objects and accomplishing module-specific tasks such as creating text or spreadsheets. In most integrated products, the drawing tools are available in any module. An exception is Beagle Bros' BeagleWorks, which doesn't have a common tool palette, although the frame tool, which creates frames, is available no matter what module you're using.

Each product's tool palette has its own advantages: ClarisWorks' palette remains constant across all applications' environments and includes a spreadsheet and text tool as well as drawing tools (see Figure 1). To access the features of another application area, you simply click on the corresponding tool to get access to the menus and commands of one environment from a document created in another.

BeagleWorks has module-specific tool palettes; you can access commands from either the menu or the tool palette of the module you're currently using (see Figure 2). The tool palette in Symantec's GreatWorks offers the most-powerful drawing tools, including a spray can, Bézier curves, and gradient fills.

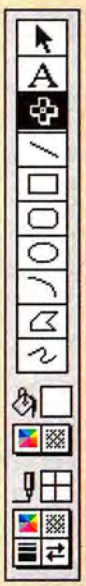


Figure 1: The ClarisWorks tool palette includes text and spreadsheet tools that let you create frames for these modules within any application environment.

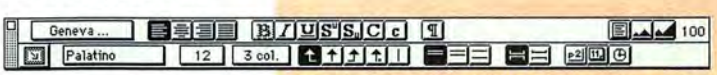


Figure 2: The BeagleWorks tool palette varies from module to module. From it, you can access menu commands.

Combining Data Elements

Generally speaking, integrated programs take either a *modular* or a *frame-based* approach to integrating data among the various modules. In the modular approach, you create different types of data in separate documents and then copy the data from the native module and paste it into the document in which you're working. In a frame-based approach, data is embedded in the document, which makes sharing data among modules much more seamless.

Microsoft Works relies heavily on the modular approach. To add a spreadsheet and a chart to a letter like the one shown here, you first use the spreadsheet module and then move the completed spreadsheet and chart to the word-processing document by copying and pasting them one at a time. Once pasted, the spreadsheet data becomes editable text, but mathematical relationships are not maintained, nor is the link between the spreadsheet's data and the chart.

ClarisWorks uses a frame-based approach. A ClarisWorks frame is an object that acts as a view into another application's environment, giving you complete access to that other environment's menus and commands. For example, to add a spreadsheet and chart to a document in ClarisWorks, you use the spreadsheet frame within your document and then chart its data. The spreadsheet frame and chart are objects that become part of the document; you don't create or save them separately.

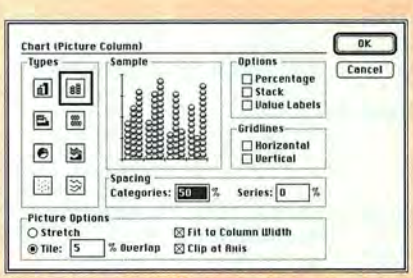
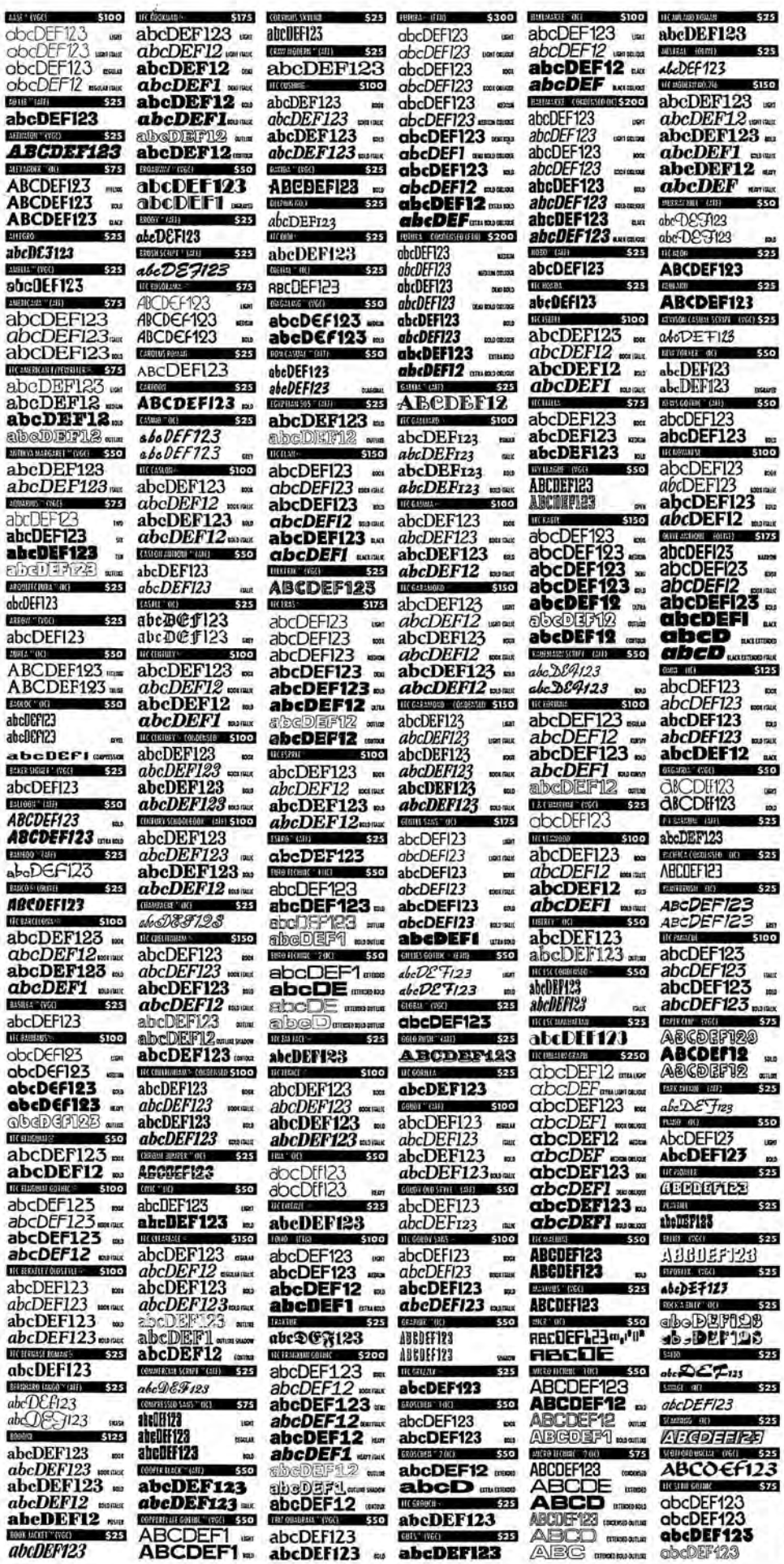


Figure 3: The GreatWorks charting option lets you create picture-column charts as well as standard bar and pie charts.



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The 30-Minute Tune-Up

Four easy steps to boost your Mac's — and your own — productivity.

By Bob LeVitus



Printing been a little slow ever since you installed System 7? Can't locate your favorite font? Need to scroll for five minutes before you find what you want on the Apple menu? If you've answered yes to any of these questions, it's time to tune up your Macintosh. But don't worry, we're not talking pliers and wrenches here — you can boost performance (your Mac's and your own) by merely installing a new system enhancement from Apple and by more efficiently managing and organizing the contents of your System Folder.

1. Tune It Up!

The first step is to get ahold of Apple's System 7 Tune-Up, which comes on one floppy disk, including an Installer. You can get it at no charge from on-line services, user groups, and Apple dealers, and it's packaged with new Macs. System 7 Tune-Up is easy to install: Just double-click on the installer icon, and the program does the rest. Once you've installed it, you'll see fewer "out of memory" messages and you'll have more memory available for application programs. You'll also experience faster, more reliable printing. You can check to see if System 7 Tune-Up is already installed on your Mac by going to About This Macintosh on the Apple menu. If there's a dot to the right of the system-software version number in the top right corner of the dialog box, the program is installed.

System 7 Tune-Up consists of a new Chooser, a new File Sharing extension, and new printer drivers for the LaserWriter and StyleWriter as well as an extension called System 7 Tuner that provides better memory management, particularly if you have 4 or fewer megabytes of RAM. System 7 Tuner has been available for several months, and there have been very few reports of bugs or incompatibilities — if you don't already have it, I recommend that you find a copy and install it as soon as possible.

Incidentally, Apple has indicated that system-software enhancements, such as QuickTime, and minor bug fixes, such as System 7 Tune-Up, will now be supplied as single-disk installers rather than as new system-software revs. This is good news, because it will reduce the frequency and complexity of your system-software updates.

2. Manage Your Extensions

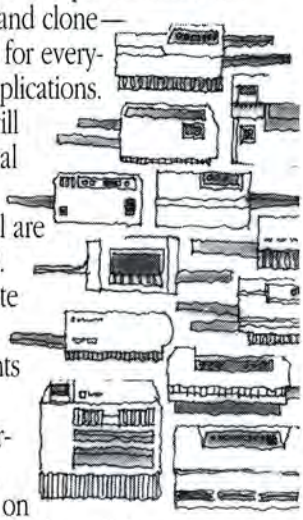
Now let's open up that System Folder and dive in. The first thing we'll look at are System 7 extensions, otherwise known as control panels (cdevs) and extensions (INITs). When you drag a file of either type into your System Folder, the Finder informs you that these items need to be stored in special places inside the System Folder in order to be available to the Mac. It politely asks if it may put them where they belong. Once that's done, your Mac tells you where it's stashed the files.

This system's very slick but not necessarily what you want. Why not? Well, for one thing,

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SEPTEMBER AD CLOSE: Tuesday, June 23, 1992

BEATING THE SYSTEM

it imposes a loading order on your extensions and control panels that might cause all sorts of problems. As you may recall, under System 6, INITs and cdevs were commingled in the System Folder—there was no Control Panels folder or Extensions folder. When you started up your Mac, INITs (in the Extensions folder) and cdevs (in the Control Panels folder) loaded in alphabetical order. The loading order was something like this: Aardvark (INIT), Badger (cdev), Cobra (INIT), Deer (cdev), and so on.

System 7 loads extensions and control panels differently: First it goes through the Extensions folder and loads its contents alphabetically. Then it loads the contents of the Control Panels folder alphabetically. Finally, it looks in the System Folder itself and alphabetically loads any extensions or control panels it finds there. Under System 7, the loading order looks something like this: Aardvark (extension), Cobra (extension), Badger (control panel), Deer (control panel), and so on.

The problem arises when certain extensions and control panels want to be loaded first or last. This category includes extension managers (more about this type of program in a moment); virus detectors; and drivers for removable-media devices such as SyQuest, Bernoulli, or optical storage drives, all of which need to load first. These programs generally arrive from their manufacturers with a space inserted before their names, which forces them to load first.

Other extensions and control panels, such as Adobe Type Manager, like being loaded last. Their names are usually preceded by a z or a tilde (~).

Here's the rub: You must place a control panel that needs to load first in the Extensions folder, or else all the extensions will load before it. But if you just drag it into the System Folder, the Finder will put it into the Control Panels folder. Here's how to work around this apparent impasse: First, double-click on the System Folder to open it, and then drag the extension or control panel into the appropriate folder or into the System Folder's open window if you want the control panel to load after everything in the Control Panels and Extensions folders.

Using this technique, you can place an extension in the Control Panels folder, a control panel in the Extensions folder, or either type of file in the System Folder rather than in the Control Panels or Extensions folder. If you do move a control panel to the Extensions folder to force it to load earlier, it's convenient to put an alias of it into the Control Panels folder so you can still access it to change settings.

Hint: Holding down the Shift key during the startup process disables all extensions and control panels.

Another problem is conflicts that occur between an extension and a control panel. When this happens, your Mac may crash when you boot up or even refuse to start up at all. Unfortunately, even System 7 can't diagnose or resolve a conflict between an extension and a control panel. Fortunately, you can often resolve conflicts among these system files by simply changing the loading order.

To force an extension or control panel to load first, preface its name with one or more spaces and move it manually to the Extensions folder if it's not already there. To force an extension or control panel to load last, move it outside the Control Panels or Extensions folder into the System Folder itself and precede its name with one or more tildes. Experimenting with the loading order usually gets things working — or at least it does so most of the time.

By the way, you should know that if a conflict prevents your Macintosh from starting up properly, holding down the Shift key during the startup process disables all extensions and control panels, which allows you to rename the files as described above.

If you use a lot of extensions or control panels, as I do, an extension-management utility such as Now Software's Startup Manager (part of the highly recommended Now Utilities package), Baseline's INIT Manager, Microseeds' INITPicker, Icom Simulations' On Startup (part of the On Cue II package), or Apple's Extension Manager can make life a lot easier. These utilities let you turn extensions and control panels on and off, change their loading order without renaming or moving them, enable or disable extensions before each startup, and automatically disable whichever extension or control panel causes a crash on startup.

My Control Panels folder contains 42

items, my Extensions folder 32. Because I never want them all to load at the same time, I use Startup Manager to create different sets for different tasks. For example, I have a file-sharing set, which includes all the file-sharing and remote-access extensions; a QuickTime set, which includes QuickTime and Wild Magic; and a CD-ROM set, which includes the CD-ROM and Foreign File Access extensions. When I turn on my Mac, I choose a set based on the tasks I expect to perform. For me, living without an extension manager would be hell.

3. Put More on the Menu

Now it's time to move on to what is undoubtedly one of System 7's finest and often most underutilized features, the Apple Menu Items folder. First and foremost, you can and should put aliases for frequently used applications, documents, and folders in there. Go ahead and do it now; I'll wait. Once you've done this, your most frequently used files will always be handy when you need them — just pull down the Apple menu, and there they are. (I also keep aliases for frequently used files and folders on the desktop, so I have more than one way to open them quickly.)

As excellent as System 7's Apple menu is, there are several inexpensive utilities that make it even better. The best of these are extensions that add hierarchical menus to the Apple menu. Look for NowMenus (part of Now Utilities), HAM (Microseeds), SuperMenu (part of Connectix's HandOff II package), or MenuChoice (shareware; available from user groups or on-line services such as *MacUser*'s ZiffNet/Mac). When you install one of these puppies, it's like putting your Apple menu on steroids. Any folder or alias of a folder in your Apple menu sprouts a hierarchical arrow so you can open any file or folder it contains by merely clicking and holding down the mouse as you scroll through the Apple menu.

Each of these utilities has slightly different features. For example, HAM and MenuChoice create a folder in your Apple Menu Items folder called Recent and store a list of recently opened folders there for easier access. SuperMenu and NowMenus let you pop up the Apple menu anywhere on the desktop by clicking while holding down a modifier key or keys. This feature is particularly useful if you have a large monitor or more than one monitor. SuperMenu has another nice feature that lets you choose a smaller font for displaying its pop-up menu.

4. Manage Your Fonts

The final step to organizing your Mac is to sort out your fonts. Happily, the dreaded and nonintuitive Font/DA Mover is obsolete under System 7. These days, installing a font is as easy as dragging its icon (or icons, if it's a PostScript font) onto the System Folder. The Finder automatically places the files where they belong — screen (or bit-mapped) fonts in the System file itself, PostScript printer (or outline) fonts in the Extensions folder.

The System 7 File: Managing Extension Manager

Apple's Extension Manager 1.6 utility lets you take care of extensions and control panels, but you can also use it to manage other items that are loose in your System Folder, such as applications or startup sounds or screens. Here's how, thanks to Mark Simmons, of Berkeley, California:

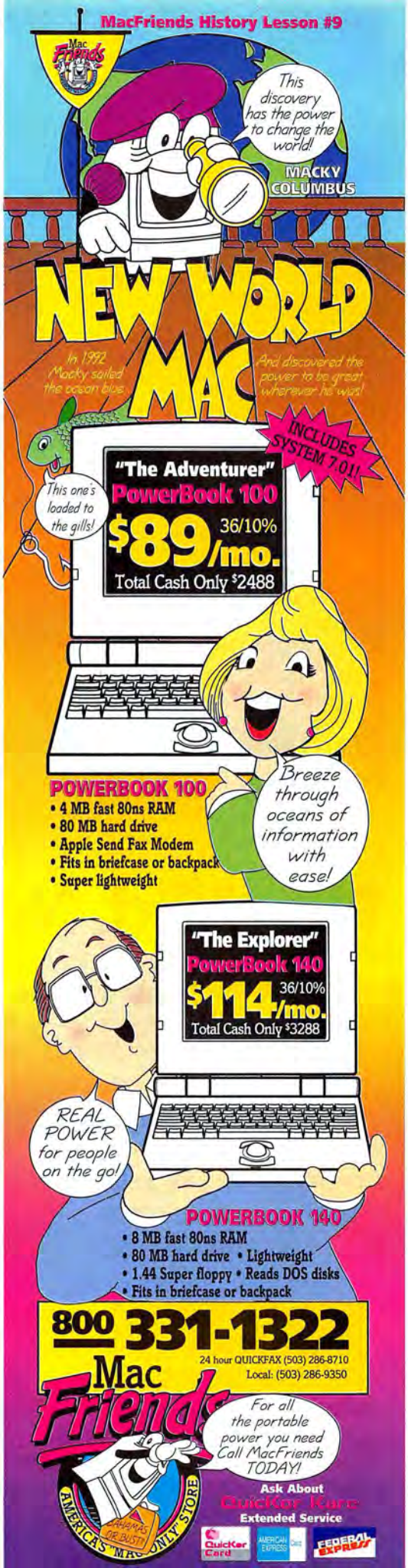
Open the Extension Manager control panel, click on the button labeled 1.6, and then click on the button labeled Configure. This brings up a window that lets you add new file types to Extension Manager's scrolling list of what's in your System Folder. You can find out what a file's type extension is by using ResEdit or a utility such as DiskTop.

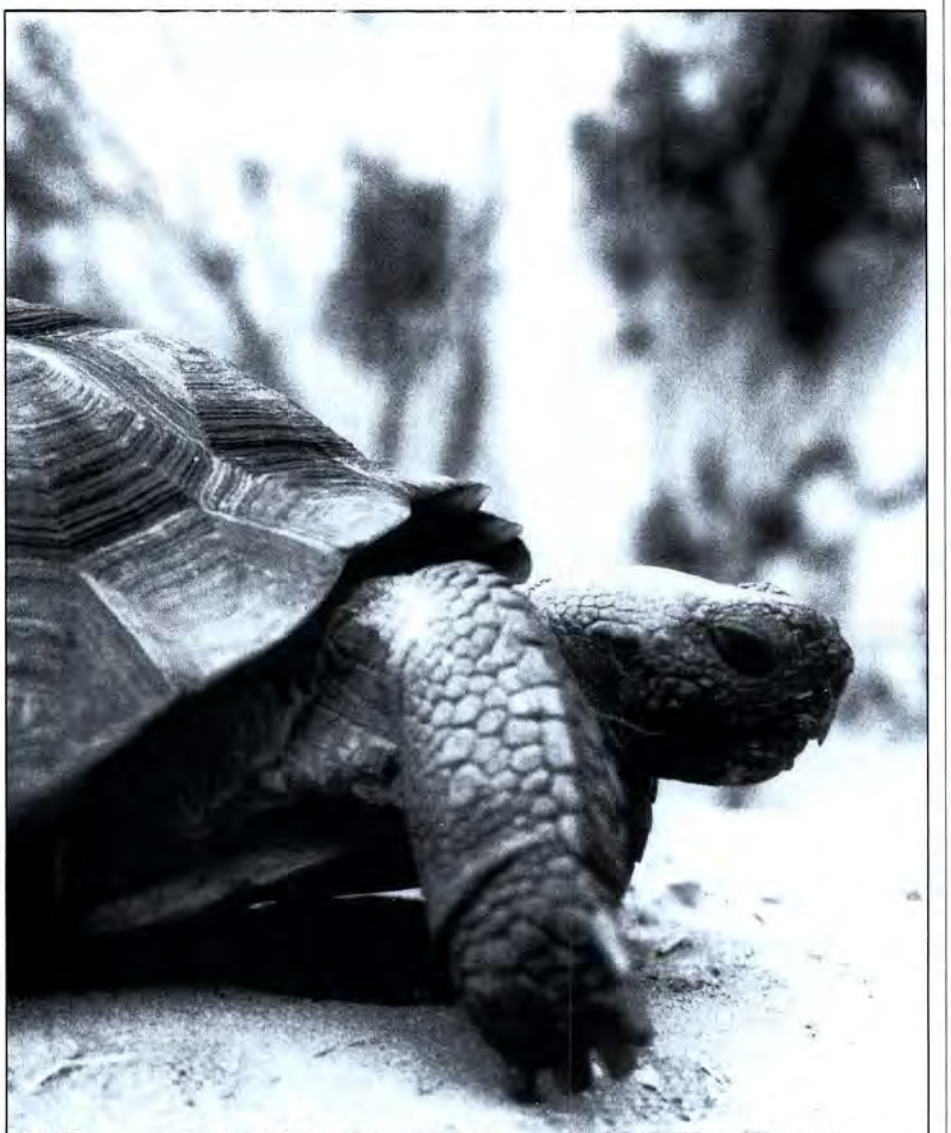
Here are a couple of ways to use this feature:

1. Add the file extension for applications (APPL) to the lower list in the Configure dialog box (just ignore the upper list). Applications you have in the System Folder, such as PrintMonitor, will now show up in the list on Extension Manager's initial screen, letting you turn them on or off.

2. Control the contents of your Startup Items folder by storing *aliases* of the programs and files you want to open on startup, rather than the programs themselves. By adding adrp (the type extension for a file alias) and fdrp (the type extension for a folder alias) to Extension Manager's list on the initial screen, you can disable these aliases if you don't want a particular program to open on startup.

Submit your favorite System 7 tips by mail or by modem in Zmac's System 7 forum (please include your address as well). If you submit the month's best tip, you'll not only receive notoriety and fame but you'll also get a spiffy "I Beat the System" T-shirt.





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POWER TOOLS

BEATING THE SYSTEM

System 7 font management is painfully slow, and if you use a lot of fonts, your System file soon swells to massive proportions with all the screen fonts it contains.

But as simple as System 7's font management is, if you use a lot of fonts, there is a better way: a font manager such as MasterJuggler or Suitcase II.

Font management under System 7 has two major drawbacks. First, it's painfully slow, especially on slower Macs. When you drag a font into or out of the System file, you can wait a long, long time to regain control of your Mac. The second problem is that if you use a lot of fonts, your System file soon swells to massive proportions with all the screen (or TrueType) fonts it contains. Although the number of fonts in your System file has no impact on your system software's RAM usage, having too many installed can be inconvenient and can chew up disk space at an alarming rate.

MasterJuggler, from ALSoft, and Suitcase II, from Fifth Generation Systems, address both of these problems: Both install and uninstall fonts far more quickly than System 7 does and compress your fonts so they take up less disk space. They also let you put any type of font — screen, TrueType, PostScript-printer font — in any folder on any volume.

I prefer MasterJuggler. It's half the price of Suitcase II — about $25 if you buy via mail order — and it has several useful features not found in Suitcase II. For example, Juggler includes a sound manager that lets you assign different sounds to such events as startup, shutdown, restart, disk insertion and ejection, and file launch. It also includes a file launcher, which, although no match for HandOff II or OnCue, is extremely handy.

Although the tune-up I've outlined here covers just the basics, it should make your Mac easier to work with. In coming issues, we'll look at more you can do to streamline your Mac.

Bob LeVitus is the author of *Dr. Macintosh, Second Edition.*

TIP SHEET



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You can also contribute tips electronically via ZiffNet/Mac, the on-line service for MacUser. *Send them to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.*

Compiled by Gregory Wasson

PowerBook

If you place an alias of the Battery control panel in the Startup Items folder, it will appear on the desktop when you start up, and you can easily tell how much power is left in the battery.

And don't forget that adding an alias of your hard drive to the Startup Items folder on any Mac lets you view the whole desktop at a glance as soon as you've booted up, without having to double-click on the hard drive's icon.

Brian D. Udell, M.D.
Fort Lauderdale, FL

Microsoft Word 5.0

To copy headers and footers into a new document, simply select and copy (Command-C) the old document's last paragraph return (turn on paragraph display by pressing Command-J if necessary) and paste (Command-V) the paragraph return into the new document. It doesn't matter how many pages long the old document is. When you display the headers and footers in the new document, you'll find that the old header or footer text has also been copied and pasted.

The footers and headers remain in the new document even if you delete the pasted paragraph return.

Diana J. Guffey
Huntington Beach, CA

Finder (System 7)

One of the more productive things you can do with System 7 is create dividers or headers in a window that's in icon view. Here's how:

Create a new folder (Command-N), and name it; using bullets (Option-8) or other symbols works well for creating dividers. Use a drawing program to create a borderless white rectangle that will fit over the folder's icon in the Get Info box (accessible from the File menu or by pressing Command-I). Copy the rectangle to the Clipboard, select the folder's icon in the Get Info box, and paste the rectangle over the icon. Now when you view this folder by icon, you'll see only its name.

Robert B. Woodward
Atlanta, GA

Tip of the Month

Microsoft Word 5.0

With Word 5.0's Border Shading feature, you can easily produce white type on a black background (see Figure A). It looks great for headings in text or tables.

Here's how to do it: First select the text (a thick, sans serif font works best). In the Character dialog box (Command-D), choose bold for the style and white as the text color. Click on OK.

With the text still selected, choose Border from the Format menu. Select 100 percent from the Shading option (to create a solid black background), and click on OK.

If you don't want the black background to stretch across the page, adjust the right margin on the ruler.

To apply inverted headings quickly, save this format as a style. If you plan to reuse the same heading text, save it in the Glossary or the Scrapbook.

Patrick Houlihan
Greenwood, MS

[*You can vary this basic procedure to produce attractive headings or chapter titles by changing the text's alignment, by using a text color other than white, or by using a border shade other than 100-percent black. — Ed.*]

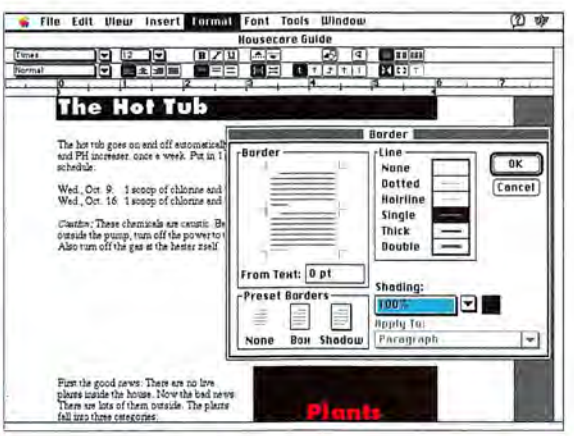


Figure A: You can use Word 5.0's Border command to create attractive section or chapter headers.

Microsoft Excel 3.0

You can add or subtract from the `&p` command in Excel's Page Setup dialog box. For example, if you type `&p+10` (there can be no spaces between the characters, or it won't work) in the Header or Footer section, the first page will have page 11 in its header or footer and so on. This is useful if you're printing spreadsheets or graphs that need to be inserted in the middle of a report.

Dan Rosman
Concord, CA

If you're creating Excel applications for clients, there are at least two things you can do to make the application easier to use:

1. When creating a macro that will take 30 seconds or so, incorporate the `MESSAGE` function into the macro to let users know, via the message/status bar, what to expect. For example, `=MESSAGE(TRUE, "Values are being reset.Please wait . . .")` is sufficient to describe what's taking so long. Be sure to use `=MESSAGE(FALSE)` to clear the status bar when the work is finished.

2. Suppress screen updating when creating macros, especially if users see only the end result or if the task takes a long time. For example, `=ECHO(TRUE)` displays all the actions until `=ECHO(FALSE)` is encountered.

Douglas A. Jankuski
Plymouth, MN

WordPerfect

WordPerfect's file selector usually defaults to the WordPerfect folder, which is a nuisance if you group documents into folders other than the application folder. It's also annoying that Page Setup selections can't be saved as a part of a style even though they can be saved in a document file.

The solution to these problems is simple: First, start WordPerfect, and then select your default style and make whatever changes you want in the Page Setup dialog box. When you've saved the document as you normally would, save it as a WordPerfect stationery pad, and put it into the same folder that contains your WordPerfect documents. If you're using System 7, you can also create an alias of the document and place it in the folder from which you usually launch WordPerfect. It's a good idea to paste the WordPerfect application icon on to the stationery document so other users will know to double-click on it.

From now on, whenever you want to use WordPerfect, double-click on the stationery pad's alias. Not only will you open to an empty document that is set up exactly the way you want but your file selector will also default to the WordPerfect document folder instead of to the application folder.

David W. Binnion
Hillsboro, OH

FreeHand

Most people use FreeHand 3.0's auto-trace tool to trace line-art bit maps, but it can also be used to trace FreeHand objects. Using this technique lets you create complicated objects by overlaying



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several simple objects and auto-tracing them. (You should know that FreeHand can't trace items at their highest resolution.) The trace will include the outline of the *entire* group of objects rather than each component plus the insides of the various shapes as they overlap. It's easy to delete any shapes you don't want.

Wayne Folta
New Carrollton, MD

Spectre

In Spectre 1.0 there's a fourth, little-known view perspective. To access it, type GOD at any point after the game has started, and you'll see the game from a view far above the game field. To get back to the normal perspectives, simply press the Tab key. This trick is particularly helpful in the network-play mode.

Jason George
Palos Verdes, CA

Adobe Illustrator

If you have a complicated design containing many individually drawn pieces tinted with various colors (colored confetti, for example), it can be difficult to select a certain set of pieces — such as all the red pieces of confetti — if they're not grouped. (Hint: When you create a design of this sort, try to group items of the same color to begin with.) Rather than going back and forth from Preview mode (where you can't edit) to Artwork mode or trying to select items with the two views open at the same time, try this:

Preview the artwork with only the Preview view open, and with a grease pencil or a china marker circle the desired items right on your computer screen. Go back to the Artwork view, and you can easily spot the items you want to select, because of the removable marks on the screen. The grease-pencil or china-marker marks rub off easily with a paper towel or tissue.

Jeanne Stevenson
Dearborn, MI

FrameMaker

Like most page-layout programs for the Mac, FrameMaker provides no easy way to print out a style sheet for a particular template. But here's a way to do it:

Open a new document based on the template whose style sheet you want to print. Save the new document in MIF format, and then open it in FrameMaker or in a word processor. You'll find the template's paragraph tags listing in the MIF file, beginning at the following line:

```
<PgfCatalog
```

The specific formatting for each paragraph tag after that line is bracketed by these lines:

```
<Pgf
<pgfTag'TagName Here'>
```

and

```
> # end of Pgf
```

Any other tags are listed in order and are always bracketed in the same way.

It may not be the ideal way to access this information, but with some editing, you can turn this codelike material into a printed style sheet that can be shared by several users.

Dave Valiulis
Scotts Valley, CA

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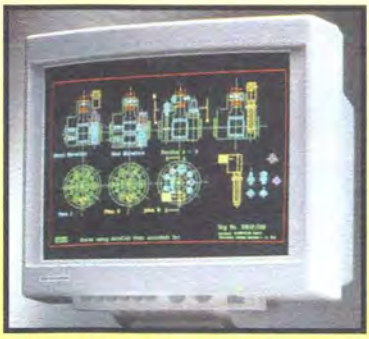


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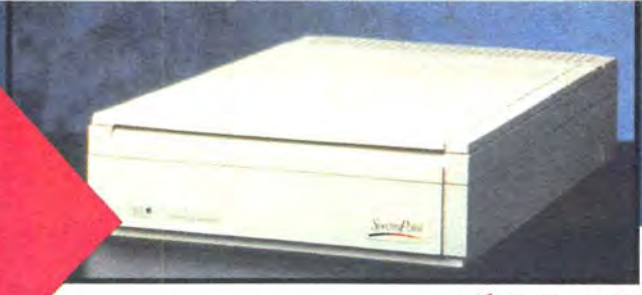


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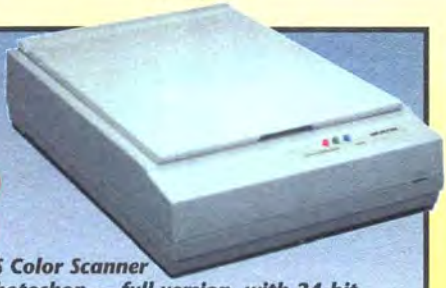
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HELP FOLDER



Questions, anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling Dr. Macintosh, *2nd edition. Andy Ihnatko is a longtime activist with the BCS•Mac. Together, they're ready to answer your questions about everything Macintosh.*

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Don't want to wait for an answer? Post your question on ZiffNet/Mac, MacUser's *on-line service, and get a reply from Bob (76004,2076), Andy (72511,204), or one of the other* MacUser *experts. See the masthead in this issue for instructions on how to sign up.*

By Bob LeVitus and Andy Ihnatko

More Yen

If you've been following our Help Folder discussion on using the Yen symbol in the Chicago font, started by Fred Pollak ("Yen for Chicago," December '91, page 255) and continued by Kevin Garrett ("Yen Again," March '92, page 227), we have a correction and some good news. The correction is that the ROv# fix Mr. Garrett mentioned does not work under System 7, because this resource only tells the System to use a disk-based System-file resource instead of a ROM resource of the same type as the resource you're overriding. In the case of Chicago, the ROM resource is a bit-mapped font (type FONT) whereas the TrueType resource you want to use instead is an outline font (type sfnt).

The good news is that Apple included a new set of Font Manager routines with TrueType. One of them, appropriately called SetOutlinePreferred, tells the system always to use the TrueType version of a font instead of the bit-mapped version — including 12-

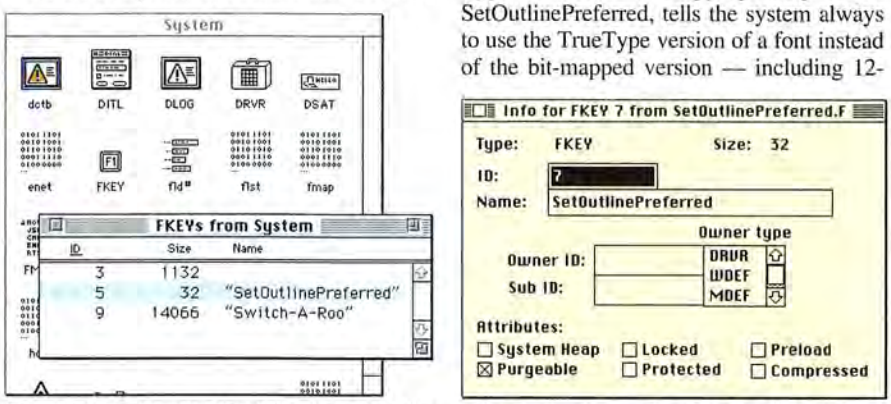


Figure 1: If you have ResEdit 2.1 or later, installing an Fkey is simply a matter of pasting the Fkey resource into your System file (left). To change an Fkey's ID number, double-click on the Fkey resource, select the Fkey, and press Command-I to get info on the resource (right). Simply type the ID number (1 to 9) you would like to use.

* . . . But Were Afraid to Ask

I'll admit it, there are places in everyday life where a little complexity is a good thing. Nuclear reactors, for instance. And, of course, the space shuttle. As I always say, you can never have enough doohickeys in a reusable orbiter.

But we here at Help Folder ain't exactly rocket scientists, so we do appreciate having an occasional simple question thrown our way. Ashamed to lower yourself so? Well, to show our appreciation for your love of simplicity, we'll say that your question was sent in by the object of the title character's affections in Selma Lagerlöf's classic tale, *Gösta Berling's Saga.*

Q. For good or bad, my bosses have instituted a recycling policy for the whole office. That's fine for the paper pushers, but as the guy who handles all the office computers, I'm left with a big problem: Are floppy disks recyclable? If so, how?

The Countess Elizabeth
Sweden

Andy: Prepare to be splattered with red paint and have clumps of trail mix heaved upon you: Even though disks are fundamentally ecostudly creatures (they're made from mostly recyclable materials), chances are that the ecofreaks will be steamed no matter what you do. The EPA and the GSA (a.k.a. the Environmental Protection Agency and the General Services Administration) maintain a bunch of lists of what's recyclable and what's not, and floppy disks don't appear on any of these lists.

So much for the government. More depressing was the letdown I experienced after calling four nonprofit recycling organizations in the Boston area. So take note, because evidently I'm going to set a national policy for the recycling of floppies here.

First, peel off all labels and toss 'em in the paper-recycling bin. Then remove the shutter and recoil spring and set 'em aside. Crack open the magazine, peel off the inside padding, and toss it in the paper bin, and then toss the magazine and the write-protect tab in the plastics-recycling bin. Cut out the spindle head from the media, and toss it in the cans-recycling bin, along with the shutter and the spring.

Or you can take the vigilante approach, chucking the whole thing in the trash and letting God sort it out. Better still, if you have a whole mess of old, viable disks on your hands, why not donate them to your local high school or library? Sure, you probably shouldn't trust them for important backups or day-to-day files, but that's no reason to remove them from the gene pool, seeing how desperate public organizations are for funds.

If you're really interested in disk recycling, go through the Yellow Pages and chat up any recycling outfits in your area; who knows, there might be a pilot floppy-recycling program in place.

point Chicago — in ROM. (The TrueType version of Chicago contains both the full extended character set and a large number of extra characters, including the Command-, Option-, Shift-, Tab-, and Delete-key symbols.) This routine needs to be turned on, and you can do so with an Fkey called SetOutlinePreferred, created by David Fowler, of Cotati, California. This Fkey lets you force the TrueType version of a font to be displayed and printed in any application. It's "smileware" (you can distribute it freely) and is available from *MacUser*'s on-line service, ZiffNet/Mac.

You can install this and other Fkeys by using utilities such as ALSoft's MasterJuggler or Fifth Generation's Suitcase II, or you can use Apple's resource-editing software ResEdit (available from on-line services and user groups). If you have ResEdit 2.1 or later installed, just double-click on the FKEY icon and ResEdit will launch. Double-click on the Fkey resource, highlight the ID number, and press Command-C to copy the Fkey to the Clipboard. Now, open a copy of your Mac's System file (move the original System file to a safe place outside the System Folder), double-click on the Fkey resource, and press Command-V to paste in the Fkey. Rename the copy of the System file, place it in the System Folder, and restart your Mac (see Figure 1).

A Quieter Drive

Q. I have an SE with an Apple 40-megabyte internal hard drive. At what seem to be random intervals, the drive emits a strange sound (as if the read/write heads were vibrating back and forth at a good speed). This behavior takes place while the drive is reading or writing data and sometimes even when the drive isn't busy. If it happens during startup, the drive doesn't mount. Worst of all, it impedes the drive's performance.

My "authorized dealer" told me that it was normal for drives to behave like this. Do you have any idea what the problem could be? Is it time for a new drive?

Andy McClary
via the Internet

Andy: A noisy hard drive is never "normal." All hard drives chatter a bit on startup and shutdown, and during formatting, they can make some sounds that'll rid your house of rodents and large insects, but any bansheelike shrieking during regular use is a sure sign of trouble. Your drive *will* go down in flames — maybe not today or tomorrow but soon and for the rest of your life. And unfortunately, there's no real fix that doesn't involve replacement. Call the drive manufacturer, and try to get warranty service. If the folks you bought the drive from won't fix it, crack open the case and find out which company built the hard-drive mechanism. Often the mechanism — the metal box making up the guts of the drive — has a longer warranty than the assembled drive! Even if chances of a free repair are nil, you might get a bargain by dealing with the mechanism manufacturer directly. Some of 'em will swap a dead unit for a good one for a somewhat nominal fee. You'll have to swap the mechanisms yourself, but it's really just a matter of unplugging three connectors.

Finally, here's a stopgap measure: If you're *absolutely* certain you have no effective warranty, try removing the mechanism from the drive, flipping it over, and delicately applying a match-head-sized dab of lithium grease between the drive spindle and the little metal pad that keeps in contact with it on the bottom of the mechanism. More often than not, the source of all that noise is spindle vibration, so sometimes a stingy amount of lubrication effectively shuts things up. Do a complete backup before attempting this — if you slather grease all over the place, the stuff may work its way up the spindle right to the platters, which will permanently destroy the drive. No matter what you do, eventually your drive is going to run-down-the-curtain-and-join-the-choir-invisible; in the meantime, however, at least your cohabitants will be able to sleep.

32-Bit Thrills

Q. I recently increased the RAM in my Mac LC from 4 to 10 megabytes. My system software used to take up 1,620K of RAM (according to About This Macintosh on the Apple menu), but after increasing my RAM to 10 megabytes, the system RAM has increased to 3,661K. What happened?

I've noticed that switching to 32-bit addressing fixes the problem, but most of my applications crash while 32-bit addressing is turned on. Is there any other way, other than turning on 32-bit addressing, to free up the 2 megabytes of RAM that has been diverted?

Speaking of 32-bit addressing, why doesn't it work well? Will it ever?

Peter Kennett
USAF/APO

Q. I'm using System 7.0.1 on a Quadra 700 with 20 megabytes of RAM and no third-party extensions or control panels. Even with the disk cache set to 512K and virtual memory, the RAM disk, and 32-bit addressing turned off, the system software still takes up 14.5 megabytes of RAM! How do I get some of that RAM back?

Barry Weise
North Hollywood, CA

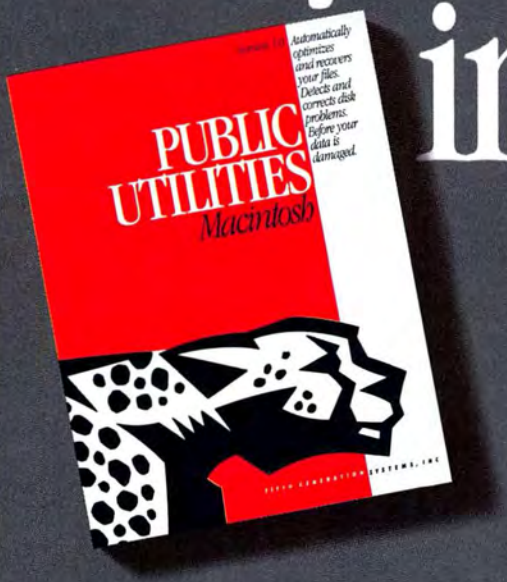
Bob: In order to use more than 8 megabytes of RAM on any Mac, you must turn 32-bit addressing on. That's the simple answer, but, of course, there's an exception to the rule. If you use Maxima, RAM-disk software from Connectix (125 Constitution Drive, Menlo Park, CA 94025; 800-950-5880 or 415-324-0727), you can access as much as 14 megabytes of RAM without turning on 32-bit addressing. Peter, you're out of luck on this one; Maxima requires a 68030 processor or a Mac II with a PMMU chip installed.

I agree that 32-bit addressing doesn't work well. Although every bit of software on my Mac is 32-bit clean, my system crashes more often when 32-bit addressing is turned on. Although I know lots of people who run a variety of applications, control panels, and extensions successfully under 32-bit addressing, it's always been somewhat flaky for me. I turn it on only when absolutely necessary.

The solution for me (and my 32-megabyte IIci) is to turn 32-bit addressing off and then use Maxima to create a 20-megabyte RAM disk. That leaves 12 megabytes of RAM available for running system software and applications, which is almost always enough. I put my System Folder on the RAM disk and boot from it, so my Mac runs a lot faster. Whenever I need to make more RAM available for applications, I reboot with 32-bit addressing turned on and keep my fingers crossed. I've been using this setup for almost a year and can't say enough nice things about it. It's wonderful.

Andy: I'll put it this way: Assuming you're unwilling (a) to wait about a year and a half for 32-bit studliness to become the norm rather than the exception and (b) to write a whole slew of 32-bit-clean apps all on your own, you need Maxima. I know 11 or so people who've used illegal copies of this commercial product, and

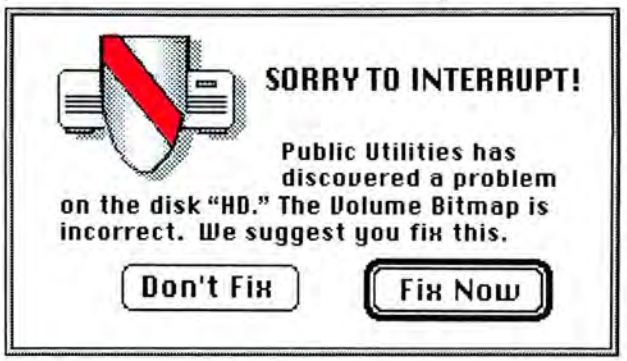
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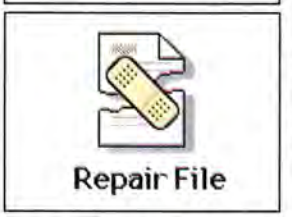
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The Start of Noise

Q. I recently bought a PowerBook 140. Every time it needs to make a sound, including the power-up chime, a loud click precedes the sound. If I record something with the microphone, the click cuts off the first tenth of a second of sound (for instance, "people" becomes "click-eople").

Is it just my PowerBook? I've already had the system board replaced once to solve another problem, but that didn't get rid of the click. Help!

Ben Freedman
Calgary, Alberta
Canada

Andy: They all do that. No, seriously, it's not a bug, it's a feature: The click is the result of a real good idea someone at Apple had. The PowerBook cuts off the juice to the internal speaker and the sound-input port when they're not in use, to save power. When they're pressed into service, a tidal wave of electrons smashes into the circuit and causes a brief audible click.

It's the same sort of thing you hear when you flick on a cheap AM radio. But then, again, the PowerBook is hardly cheap. Why didn't Apple toss a three-cent capacitor into the circuit to absorb the click? Who knows?

Footnote Fetish

Q. How can I use PageMaker 4.0 to put a footnote (or more than one) on the bottom of the page on which the footnote reference appears rather than in a separate chapter at the end of my book? If it's not possible with PageMaker, which page-layout program (*not* word processor) can do this automatically or at least easily?

Joesoef Isak
Jakarta
Indonesia

Bob: You can sort of do what you want with PageMaker. If you're adventurous and don't mind doing a little programming, you can automate much of the process with PageMaker 4.2's built-in scripting. Or for even more power, check out UserLand Frontier (UserLand Software, 490 California Avenue, Palo Alto, CA 94306; 415-325-5700), a scripting program that lets you write scripts to control almost every aspect of PageMaker 4.2.

If that sounds like too much trouble for you, check out FrameMaker (Frame Technology, 1010 Rincon Circle, San Jose, CA 95131; 408-433-3311) and Ventura Publisher (Ventura Software, 15175 Innovation Drive, San Diego, CA 92128; 619-673-0172), a pair of page-layout programs that are particularly good at producing long, structured documents. Each can automatically place footnotes at the bottom of the page on which the reference number appears, and each allows extensive control over the footnotes' appearance. I find FrameMaker easier to use and significantly more Mac-like than Ventura Publisher. It's also a darn good word processor, something that can't be said for Ventura Publisher (or PageMaker or QuarkXPress, for that matter).

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LC: Less Coverage?

Q. I recently purchased a Mac LC with a 12-inch color monitor, and I'm having problems getting some applications (especially games) to run properly. The problem is that some of the applications don't conform to the screen size and part of their images seem to go past the edges of the desktop. Is there an easy solution to this problem, maybe in the form of a system extension?

Jim Watling

Ann Arbor, MI

Andy: A simple problem and, thankfully, there's a simple solution. The problem: You've bought a goofball monitor — a color screen with Mac Classic resolution — and programmers would rather soul-kiss a light socket than rewrite their games to support it (a notable exception: Inline Design, whose Mutant Beach works fine on a 12-inch monitor). The solution: Buy a 13-inch monitor.

To elaborate, games are exceedingly odd pieces of software. White-collar-establishment applications (word processors, database managers, spreadsheet programs) don't care what size monitor you're using. Users can always resize windows and scroll, the tool palettes can fit in even the tiniest screen, and anyone who designs a menu bar that's wider than 512 pixels would have his programmer's beanie taken away immediately. But games generally don't take advantage of the Mac interface; they paint and animate all over the screen, so special versions have to be written for each monitor type. Most games are written for a 13-inch color display (640 x 480 pixels), and when you try to play 'em on a 12-inch screen (512 x 342 pixels), you get to see only one corner.

My advice is to get a new monitor, but if you want to try a software solution, check out Stepping Out II, from Berkeley Systems (1700 Shattuck Avenue, Berkeley, CA 94709; 510-540-5536). It sets up a virtual screen of just about any size. When your mouse pointer reaches the edge of the real screen, the display will scroll to reveal additional real estate. It works just dandy in programs such as PageMaker and Excel, but it's less of a smash hit with games. You *still* won't be able to see more than 512 x 342 dots at once, and if the Lizard King is setting up a mortar off-screen, you're going to wish you'd spent the $800 for a 13-inch monitor.

To save money, look at third-party monitors such as the Sony CPD-1304, the Seiko CM-1445, or the NEC 3FGX. To save a *lot* of money, buy an IBM-type VGA color monitor instead. Apple quietly made sure that the LC's video port would be compatible with these popular (and cheap!) monitors. You'll need an adapter such as the Mac VGA ($25), manufactured by James Engineering (510-525-7350), to use one of these monitors.

Bob: If you're buying a new monitor, you may need to buy additional video RAM, because older Mac LCs don't have enough VRAM to support 256 colors on a 13-inch monitor. By the way, don't buy that VRAM from Apple — third parties such as Technology Works sell it for much less.

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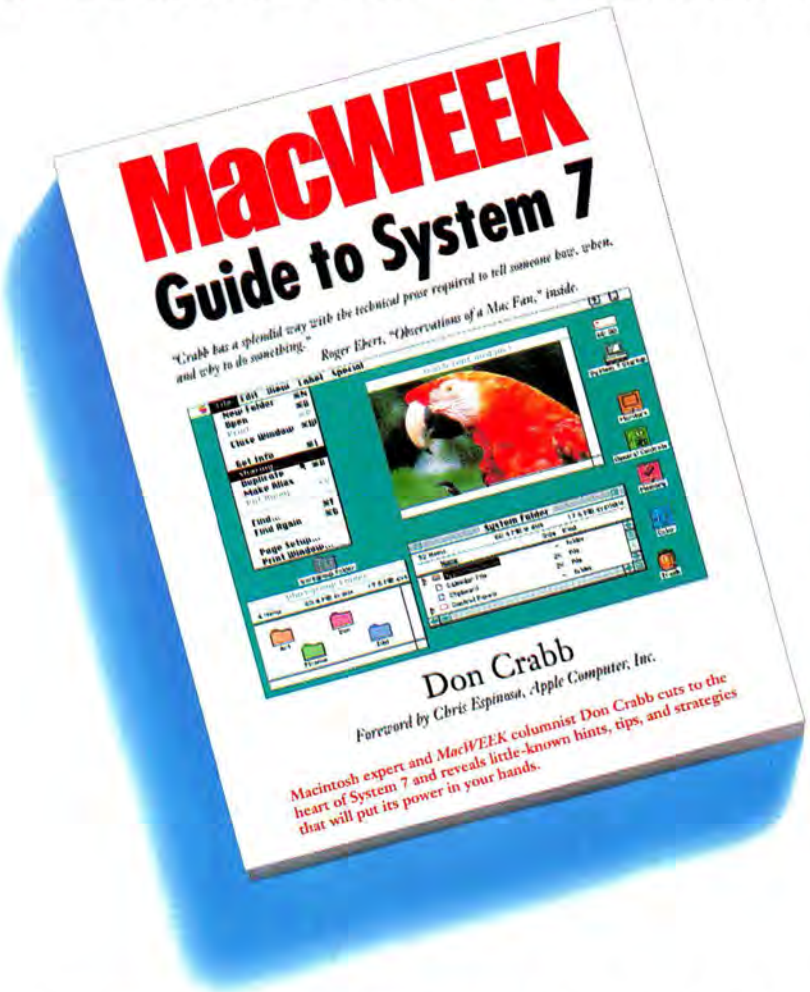
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This Month on ZiffNet/Mac

ZMAC UTILITY

In the complex world of data storage, users are often left wondering what type of device best suits their needs — a hard-disk drive, optical discs, removable cartridges, digital audiotape, or something completely different? This month, *MacUser* introduces a free expert system that can answer the question, Which storage device should I buy?

Developed by Danny Goodman and Shef Syed, this HyperCard 2.1 stack is patterned after their March '92 stack, Which Mac Should I Buy? To use the storage-device stack, you need to provide some basic information such as the size of your budget, the intended purpose of the storage device, and what sort of applications you use. Based on MacUser Labs' data, the stack provides a selection of the best devices, including "Bottom Line" picks from previous lab reports, for the job at hand.

Which Storage Device Should I Buy? is available exclusively on ZiffNet/Mac. The filename is WCHDRV.CPT, and it's in Library 3 (Utilities) of the MacUser Forum (GO ZMC:MACUSER) and in Library 7 (Reference) of the Download & Support Forum (GO ZMC:DOWNTECH).

By Ben Templin

Hard (Drive) Decisions

A HyperCard expert system can help you make the right decision about purchasing a hard drive, but sometimes it's best to get the advice of a living expert. *MacUser* associate editor Mark Frost is available for consultation from June 15 to 19 in Message Section 5 (Labs & NetWorkShop) of the MacUser Forum (GO ZMC:MACUSER). Mark can tell you when it's time to step up to a gigabyte drive and when you should stick with your old SyQuest.

Hot New Files

Here's a batch of recent uploads to ZiffNet/Mac. To make locating the files easier for you, the CompuServe filenames are in parentheses. All the files listed here can be found in the Download & Support Forum (GO ZMC:DOWNTECH).

Carpetbag (CARPET.CPT) is a control panel that makes resources such as fonts, sounds, and Fkeys available to the system without actually installing them in the System Folder — in short, a poor man's Suitcase II or MasterJuggler. Shareware, $5.

DiskStatus (DISTAT.CPT) is a program that provides a real-time display of the available and used space on all your current drives, including the floppy drive. It is intended to be a startup application under MultiFinder or System 7's Finder, where it sits quietly on your desktop, ready to provide information whenever you need it. Freeware.

DMM LaserWriter Stuff (LWSTUF.CPT) enhances Apple's LaserWriter 7 printer drivers by adding features such as the ability to print thumbnail views of several pages on one sheet of paper. Freeware.

FileType Changer (FILETY.CPT) is a HyperCard 2.1 stack that allows you to change the type and creator resources of any file without using ResEdit. This stack supports batch processing. Freeware.

Greg's Buttons (BUTTON.CPT) is a System 7 extension that replaces the standard black-and-white buttons, check boxes, and radio buttons with new "mondo cool" color 3-D ones. Shareware, $10.

Mariner (MARINE.CPT) is a very slick shareware spreadsheet utility that provides split windows, variable size of rows and columns, charts, and more. It has a tear-off palette that enables you to chart numbers in a graph, bar chart, pie chart, or scatterplot. Shareware, $40.

System 7 Pack! (7PACK.CPT) lets you customize your System 7 Finder without rebooting. It offers features that enable you to increase the speed of Finder file copies, remove the annoying application-substitution dialog box, change keyboard command equivalents in System 7's Finder, change menu-item names, and add a Quit menu. Shareware, $29.95.

Trimmer (TRIMMR.CPT) is a System 7 control panel that lets you select which fonts you want to include in PostScript files that are printed to disk. Trimmer also includes a check box for excluding the laserprep PostScript header from files saved to disk. Shareware, $10.

Zmac Tip of the Month: Full Text for Less

Want to look up something from a back issue of *MacUser*? You can get the full text of any *MacUser* article through Computer Library, an on-line megadatabase that contains articles and citations from 150 computer magazines.

However, Computer Library carries a surcharge — $15 per hour plus $2.50 per article. If you need only the issue reference — or want to minimize the Computer Library cost — you should check out the MacUser/MacWEEK Index (GO ZMC:INDEX).

The MacUser/MacWEEK Index, which has no connect charges, lets you search for articles according to product, company, or topic. The resulting citation tells you in which issue the article appeared.

If you need the full text of the article, simply note the article number at the bottom of the citation and then go into Computer Library and search by article number. This approach reduces your browsing time and can result in significant cost savings.



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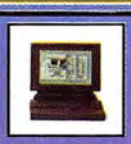
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- Insight Development Mac Print v1.3 85
- Kent Marsh LTD FileGuard 2.7 105
- Kent Marsh LTD FolderBolt 69
- Kent Marsh LTD GuardCard 95
- Microcom Complete Undelete 44
- Microcom Virex v3.1 55
- Now Utilities 3.0 **(special price)** 85
- Salient DiskDoubler 3.7 or AutoDoubler 45
- Symantec AntiVirus for Mac (SAM) 61
- Symantec Norton Utilities for Mac 79
- Symantec Sum II 2.1 92

Accessories

- Avery Dennison MacLabel Pro 45
- Byte Bros. Care-Free Security Kit 23
- Caere Typist Plus Graphics 449
- Curtis Keyboard Organizer **(special)** 25
- Curtis TK-2 52 Piece Tool Kit 45
- I/O Design MacLuggage Ult Notebook EX 69
- I/O Design MacLuggage Ult Classic/SE 65
- I/O Design MacLuggage Ult Notebook SL 59
- Kensington Antiglare Filter ..... Call

continued below

- Kensington Apple Security System 32
- Kensington Laser Stand **(special price)** 110
- Kensington Mac Monitor/CPU Stand 49
- Kensington Maccessories A-B Switch Box 59
- Kensington Master Piece Remote 105
- Kensington Master Stand 52
- Kensington PassProof **(special price)** 59
- Kensington SystemSaver Mac 59
- Kensington Turbo Mouse ADB 99
- Keytronic MacPro Plus Keyboard 119
- T/Maker Power Bundle 155

MAC's

- Macintosh Powerbook 100, 140, 170 ..... Call
- Macintosh Classic, Classic II ..... Call
- Macintosh LC ..... Call
- Macintosh IISi, CI ..... Call
- Macintosh FX ..... Call

Displays & Video

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- E-Machine Color Page T16 1699
- Magnavox 9CM080 Monitor 399
- Seiko CM 1445 14" Color Monitor 539
- Seiko CM 1445 Color w. 264 Board 1029
- Sigma ColorMax 19" Trinitron Color 2349
- SuperMac 21" Supermatch 2 pg Color 2599
- SuperMac Spectrum/8 Series III **(special)** 479
- SuperMac SuperMatch 19" Color 1699

Input

- Datadesk Int 101E Keyboard **(special)** 115
- Datadesk Int 101E w/Quickeys 2 139
- Kensington Turbo Mouse ADB 99
- KeyTronics TrackPro **(special price)** 209
- Logitech Mouseman 79
- Logitech Trackman 89
- MacPro Plus Keyboard 145
- Mouse Systems A3 Mouse 79
- Mouse Systems A3 Trackball **(special)** 73

Networking

- Asante EN/SC **(special price)** 279
- Asante Maccon II+ ET 159
- Asante Maccon II+ ET 64 199
- Asante Maccon+ 301 Et 179
- CE Softeware Quickmail v2.5(1-5 user) 117
- DataViz MacLink Plus Translators v6.0 97
- DataViz MacLink Plus/PC v6.0 117
- Dayna Etherprint 309
- Dayna Port E/II **(special price)** 199
- DoveFax Plus Desktop w. Voicemail 359
- Fallaron Timbuktu/Remote v3.0 123
- Global Village PowerPort/v32 439
- Hayes Personal Modem 2400+ 139
- Hayes Ultra 144 899
- Practical Smartpack 2400 Modem 209
- Practical Smartpack 9600 Modem 529
- ProModem 24/96 fax modem 278
- ProModem 2400 Mini External **(special)** 119
- PSI PowerModem 189
- Software Ventures Microphone II v4.0 189
- Synergy Software Versaterm/Pro v3.6 155
- Teleport ADB Fax Modem 184
- Teleport/Fax 9600 185
- Travelling Software LapLink Mac III v3.2 89
- White Pine Mac 241 VT241 Em v3.1.4 169

Printers/Scanners/Storage

- Abaton Laser Script LX 1499
- Caere Typist Plus Graphics 399
- Costar Address Writer Envelope Printer 499
- Costar LabelWriter II 1" Head 120v 189
- CoStar LabelWriter II Plus 2 1/4" Head 269
- Epson EPL-7500 Laser Page Printer 2199
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- Kodak Color 4 Ink Jet **(special price)** 599
- Kodak Diconics M150plus 309
- Logitech Scannman 32 Mac 269
- Microtek Lab ScanMaker 600ZS 399
- Microtek Scanmaker 600ZS 1259
- NEC CDR 36 CD-Rom 1649
- Okidata OL840 Postscript Printer 1599
- Orange Micro Grappler LS **(special)** 65
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PRODUCT INDEX

ADVERTISER	PAGE
Display Systems & Video	
Aura Systems 800-365-AURA	214
Envisio 612-339-1008	84
Express Direct 800-535-3252	251-253
Hardware that Fits 800-972-3018	228-233
MacNews 800-243-9383	272-273
Mirror Technologies 800-654-5294	199-201
NEC Technologies 800-NEC-INFO	BG2-3
RasterOps 800-SAY-COLOR	88
Education	
Educational Resources Ltd. 800-624-2926	294
MacAcademy 800-527-1914	31
Que Corporation 800-428-5331	BG15
Entertainment	
Spectrum HoloByte 510-522-3584	89
Financial Management	
Peachtree Software 800-428-9976	74
General Hardware & Accessories	
Hardware that Fits 800-972-3018	188
Lind Electronic Design 612-927-6303	58
Micro Security Systems 800-456-2587	287
Moustrak 800-221-6687	215
Outbound Systems, Inc. 800-444-4607	40
PrePress Direct 800-443-6600	30
Verbatim Corporation 704-547-6500	BG23
Graphics & Design	
AGFA Div. - Type 800-424-TYPE	172
Aldus Corporation 206-628-2320	174-175
Claris Corporation 800-3CLARIS	51
Deneba Software 305-594-6965	15
Frame Technology 800-843-7263 ext. 857	17
Image Club Graphics Inc. 800-661-9410	220
Letraset 800-343-TYPE	80
Specular International 413-549-7600	207
T/Maker 415-962-0195	59
Input Devices	
Articulate Systems, Inc. 800-443-7077	19
CoStar 800-4-COSTAR	89
Science Accessories 203-386-9978	295
Mail Order	
Advance Business Center 800-274-7747	243
Bottom Line Distribution 900-420-3737	244-245
Callsoft 800-777-5514	246
Diskette Connection 800-654-4058	283
Dr. Mac 800-825-6227	266-267
Focus Inc. 800-538-8866	20-21
Hard Drives International 800-998-8024	289
La Cie Limited 800-999-0143	275-282
Mac & More 800-945-1MAC	254-255
Mac's Place 800-367-4222	258-265
MacCenter 800-950-3726	256-257
MacConnection 800-800-4444	60-69
MacDepot 800-222-2808	290
MacFRIENDS 800-331-1322	176, 177, 196, 197, 223
MACLAND 800-333-3353	284-285
MacProducts, USA 800-622-3475	270-271
MacSource 800-925-2622	287
MacTel Technology 800-950-8411	283
MacTown 800-338-4273	242
MacWarehouse 800-255-6227	178-183
MacZone, The 800-248-0800	32-39
Third Wave Computing 800-448-0404	268-269
Networking & Connectivity	
Asante Technologies 800-662-9686	22
CE Software 800-523-7638	25
Dayna 800-531-0600	186
DEC 800-343-4040 ext. 117	26-27
Farallon 800-827-7759	Cover 4
Insignia Solutions 800-848-7677	11
Lotus 800-448-2500	90-91
Now Software 800-237-3611	BG52
TECHWORKS 800-879-1642	44
Organizational Tools	
AEC Software 800-346-9413	6
After Hours Software 818-780-2220 ext. 144	4
Ceres Software, Inc. 800-877-4292	75

ADVERTISER	PAGE
Kaetron Software Corporation 713-890-3434	14, 16
Mainstay 818-991-6540	86
Microsoft	Cover 2, p. 1
Pastel Development 212-941-7500	BG39
Output Devices	
GCC Technologies 800-422-7777	107, 109
GDT Softworks Inc. 800-663-6222	76
Hardware that Fits 800-972-3018	208-213
LaserMaster Corporation 800-950-6868	99
Lexmark 800-358-5835	8-9
MindGate Technologies, Inc. 800-MGT-6840	72
Mirror Technologies 800-654-5294	199-201
QMS, Inc. 800-422-2769 ext. 2932	71
Tektronix 800-835-6100 Dept. 21A	43
Texas Instruments 800-527-3500	238-239
XANTE Corporation 800-926-8839	204
Xerox Corporation 800-TEAM-XRX ext. 702	BG27
Performance Enhancers	
Applied Engineering 800-554-MACS ext. 554	5
Daystar Digital 800-962-2077	BG59
Radius 800-227-2795	BG47
TECHWORKS 800-879-1642	44
Programming & Systems	
Serius Corporation 800-876-6847	226-227
Resources	
Marketplace Info. Corp. 617-894-4100	24
Spreadsheets & Numerical Analysis	
Callsoft 800-777-5514	246
Lotus 800-TRADEUP	82-83
Storage Systems	
APS Technologies 800-235-2750	291-293
APS Technologies 800-446-6511	BG7
Club Mac 800-854-6227	288
dgr Technologies, Inc. 800-235-9748	286
Direct Tech 800-279-5520	274
FWB Software 415-474-8055	BG25
GCC Technologies 800-422-7777	143
KAO Information Systems 800-759-2590	48
Liberty Systems 408-983-1127	283
Microtech International Inc. 800-325-1895	BG21
Mirror Technologies 800-654-5294	199-201
Panasonic 800-742-8086	BG36
Pinnacle Micro 800-553-7070	BG28-29
PLI 800-288-8754	BG60, Cover 3
Sony Recording Media	BG55
Utilities	
A & A Co., LTD 415-848-8080	274
Aladdin Systems, Inc. 408-761-6200	10
ALSoft, Inc. 713-353-4090	18
Berkeley Systems 800-248-0800	42
CE Software 800-523-7638	25
Central Point 800-947-9443	144A/B, 145
Connectix Corporation 800-950-5880	12
Dantz Development Corp. 510-849-0293	50
DataViz 800-733-0030	78
Dubl-Click 818-700-9525	70
Fifth Generation Systems, Inc. 800-666-2904	28, BG57, 110, 236-237
GDT Softworks Inc. 800-663-6222	76
Insignia Solutions 800-848-7677	202
Kent Marsh, Ltd. 800-325-3587	194
MAXA Corporation 800-788-6292	7
Microcom - Virex 919-490-1277	206
Now Software 800-237-3611	BG52
Salient Software 415-321-5375	81
Symantec Corporation 800-343-4714 ext. 606G	87
Symantec Corporation 800-343-4714 ext. 754F	BG41
Teknosys 800-873-3494	79
Word Processing	
Calera Recognition Systems 800-544-7051	77
Callsoft 800-777-5514	246
Nest Software 800-524-3315	195
T/Maker 415-962-0195	73
General	
3M Data Storage 800-328-9438	BG30

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RS#	ADVERTISER	PAGE
248	3M Data Storage	BG30
30	A & A Co., Ltd.	274
176	Advance Business Center	243
100	AEC Software	6
N/A	After Hours Software	4
N/A	AGFA Corp. Type Div.	172
183	Aladdin Systems, Inc.	10
N/A	Aldus Corporation	174-175
170	ALSoft, Inc.	18
70	Applied Engineering	5
148	APS Technologies	BG7
147	APS Technologies	291-293
71	Articulate Systems, Inc.	19
81	Asanté Technologies	22
110	Aura Systems	214
19	Berkeley Systems	42
N/A	Bottom Line Distribution	244-245
96	Calera Recognition Systems	77
236	CallSoft	246
72	CE Software	25
151	Central Point	144A-145
20	Ceres Software, Inc.	75
N/A	Claris Corporation	51
46	Club Mac	288
60	Connectix Corporation	12
62	Connectix Corporation	12
88	CoStar	89
28	Dantz Development Corp.	50
171	DataViz	78
133	Dayna	186
159	Daystar Digital	BG59
N/A	DEC	26-27
186	Deneba Software	15
242	dgr Technologies, Inc.	286
33	Direct Tech	274
122	Diskette Connection	283
39	Dr. Mac	266-267
90	Dubl-Click	70
112	Educational Resources Ltd.	294
37	Envisio	84
128	Express Direct	251-253
175	Farallon	Cover 4
106	Fifth Generation Systems	28
107	Fifth Generation Systems	110
103	Fifth Generation Systems	BG57
102	Fifth Generation Systems	236-237
240	Focus, Inc.	20-21
126	Frame Technology	17
84	FWB Software	BG25
164	GCC Technologies	107
165	GCC Technologies	109
166	GCC Technologies	143
18	GDT Softworks Inc.	76
N/A	Hard Drives International	289
197	Hardware That Fits	188-192
198	Hardware That Fits	208-213
199	Hardware That Fits	228-233
89	Image Club Graphics, Inc.	220
152	Insignia Solutions	11
153	Insignia Solutions	202
97	Kaetron Software Corp.	14
98	Kaetron Software Corp.	16
120	KAO Information Systems	48
36	Kent Marsh, Ltd.	194
N/A	La Cie Limited	275-282
178	LaserMaster Corporation	99
190	Letraset	80
N/A	Lexmark	8-9
74	Liberty Systems	283
21	Lind Electronic Design	58
N/A	Lotus	82-83
N/A	Lotus	90-91
41	Mac & More	254-255
83	MacAcademy	31
1	MacCenter	256-257
N/A	MacConnection	60-69
53	MacDepot	290
N/A	MacFRIENDS	176
N/A	MacFRIENDS	177
N/A	MacFRIENDS	196
N/A	MacFRIENDS	197
N/A	MacFRIENDS	223
150	MacLand	284-285
45	MacNews	272-273
137	MacProducts USA	270-271
155	Mac's Place	258-265
48	MacSource	287
154	MacTel Technology Corp.	283
17	MacTown	242
156	MacWarehouse	178-183
N/A	MacZone, The	32-39
76	Mainstay	86
N/A	MarketPlace Info. Corp.	24
239	MAXA Corporation	7
64	Micro Security Systems	287
75	Microcom-Virex	206
N/A	Microsoft	Cover 2-01
160	Microtech International	BG21
42	MindGate Technologies, Inc.	72
118	Mirror Technologies	199-201
125	Moustrak	215
143	NEC Technologies, Inc.	BG2-3
73	Nest Software	195
177	Now Software	BG52
79	Outbound Systems, Inc.	40
130	Panasonic	BG36
82	Pastel Development	BG39
78	Peachtree Software	74
80	Pinnacle Micro	BG28-29
181	PLI	BG60
182	PLI	Cover 3
58	PrePress Direct	30
50	QMS, Inc.	71
145	Que Corporation	BG15
195	Radius, Inc.	BG47
N/A	RasterOps	88
123	Salient Software	81
132	Science Accessories	295
115	Serius Corporation	226-227
168	Sony Recording Media	BG55
65	Spectrum HoloByte	89
85	Specular International	207
N/A	Symantec Corporation	87
N/A	Symantec Corporation	BG41
86	T/Maker	59
87	T/Maker	73
104	TechWorks	44
105	TechWorks	44
138	Teknosys	79
40	Tektronix	43
172	Texas Instruments	238-239
101	Third Wave Computing	268-269
162	Verbatim Corporation	BG23
108	XANTE Corporation	204
N/A	Xerox Corporation	BG27

BG denotes 1992 MacUser Mass Storage Buyer's Guide

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001 002 003 004 005 006 007 008 009 010 011 012 013 014 015 016 017 018 019 020 021 022 023 024 025 026 027 028 029 030 031 032 033 034 035 036 037 038 039 040 041 042 043 044 045 046 047 048 049 050
051 052 053 054 055 056 057 058 059 060 061 062 063 064 065 066 067 068 069 070 071 072 073 074 075 076 077 078 079 080 081 082 083 084 085 086 087 088 089 090 091 092 093 094 095 096 097 098 099 100
101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150
151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200
201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250
251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300
301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350
351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400
401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450
451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500
501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550
551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600

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☐ 01) 1-4 ☐ 02) 5-49 ☐ 03) 50+

2. Your primary job function is: (check one)

☐ 01) Administrative/ General Management
☐ 02) MIS/DP, Communications Systems, Programming
☐ 03) Engineering/R&D
☐ 04) Finance/Accounting
☐ 05) Marketing/Sales
☐ 06) Computer Dealer/VAR

3. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)

4. Which of the following products have you bought in the last 6 months? (check all that apply)

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Project Managers	☐ 03	☐ 03
Word Processors	☐ 04	☐ 04
Database Managers	☐ 05	☐ 05
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Integrated Software	☐ 07	☐ 07
Communications	☐ 08	☐ 08
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HARDWARE	Q3	Q4
Modems	☐ 10	☐ 10
Scanners	☐ 11	☐ 11
Microcomputer	☐ 12	☐ 12
Printers/Plotters	☐ 13	☐ 13
Monitors/Displays	☐ 14	☐ 14
Storage	☐ 15	☐ 15
Add-in Boards	☐ 16	☐ 16
Networking	☐ 17	☐ 17

5. If so, what function do you serve in the buying process? (check all that apply)

☐ 01) Initiation/ Determine Need
☐ 02) Selection of Brand and Model
☐ 03) Selection of Source
☐ 04) Authorization
☐ 05) Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)

☐ 01) over $5 million
☐ 02) $1 - 5 million
☐ 03) $500,000 - $999,999
☐ 04) $100,000 - $499,999
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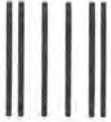
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1. For how many micro computers do you buy products? (check one)
☐ 01) 1-4 ☐ 02) 5-49 ☐ 03) 50+

2. Your primary job function is: (check one)
☐ 01) Administrative/ General Management
☐ 02) MIS/DP, Communications Systems, Programming
☐ 03) Engineering/R&D
☐ 04) Finance/Accounting
☐ 05) Marketing/Sales
☐ 06) Computer Dealer/VAR

3. For which of the following products are you involved in selecting brands/models to be bought by your company or organization? (check all that apply)

4. Which of the following products have you bought in the last 6 months? (check all that apply)

SOFTWARE	Q3	Q4
Accounting	☐ 01	☐ 01
Spreadsheets	☐ 02	☐ 02
Project Managers	☐ 03	☐ 03
Word Processors	☐ 04	☐ 04
Database Managers	☐ 05	☐ 05
Graphics	☐ 06	☐ 06
Integrated Software	☐ 07	☐ 07
Communications	☐ 08	☐ 08
Utilities	☐ 09	☐ 09

HARDWARE	Q3	Q4
Modems	☐ 10	☐ 10
Scanners	☐ 11	☐ 11
Microcomputer	☐ 12	☐ 12
Printers/Plotters	☐ 13	☐ 13
Monitors/Displays	☐ 14	☐ 14
Storage	☐ 15	☐ 15
Add-in Boards	☐ 16	☐ 16
Networking	☐ 17	☐ 17

5. If so, what function do you serve in the buying process? (check all that apply)
☐ 01) Initiation/ Determine Need
☐ 02) Selection of Brand and Model
☐ 03) Selection of Source
☐ 04) Authorization
☐ 05) Other

6. Over the next 12 months, how much will your organization spend on computer products or services? (check one)
☐ 01) over $5 million
☐ 02) $1 - 5 million
☐ 03) $500,000 - $999,999
☐ 04) $100,000 - $499,999
☐ 05) $50,000 - $99,999
☐ 06) $10,000 - $49,999
☐ 07) under $10,000

MU 7/92-4

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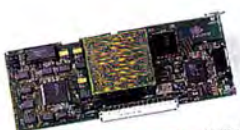
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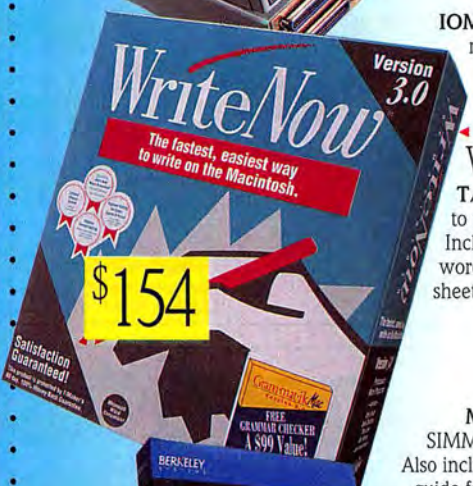
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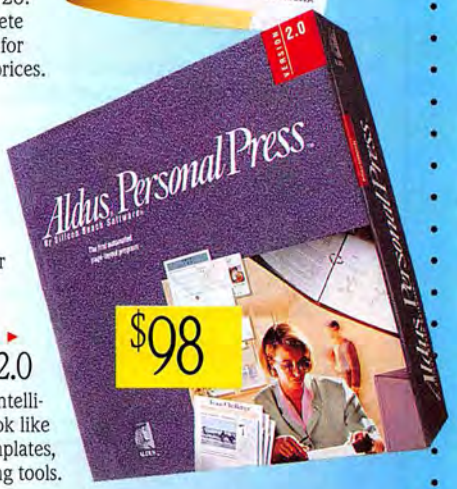
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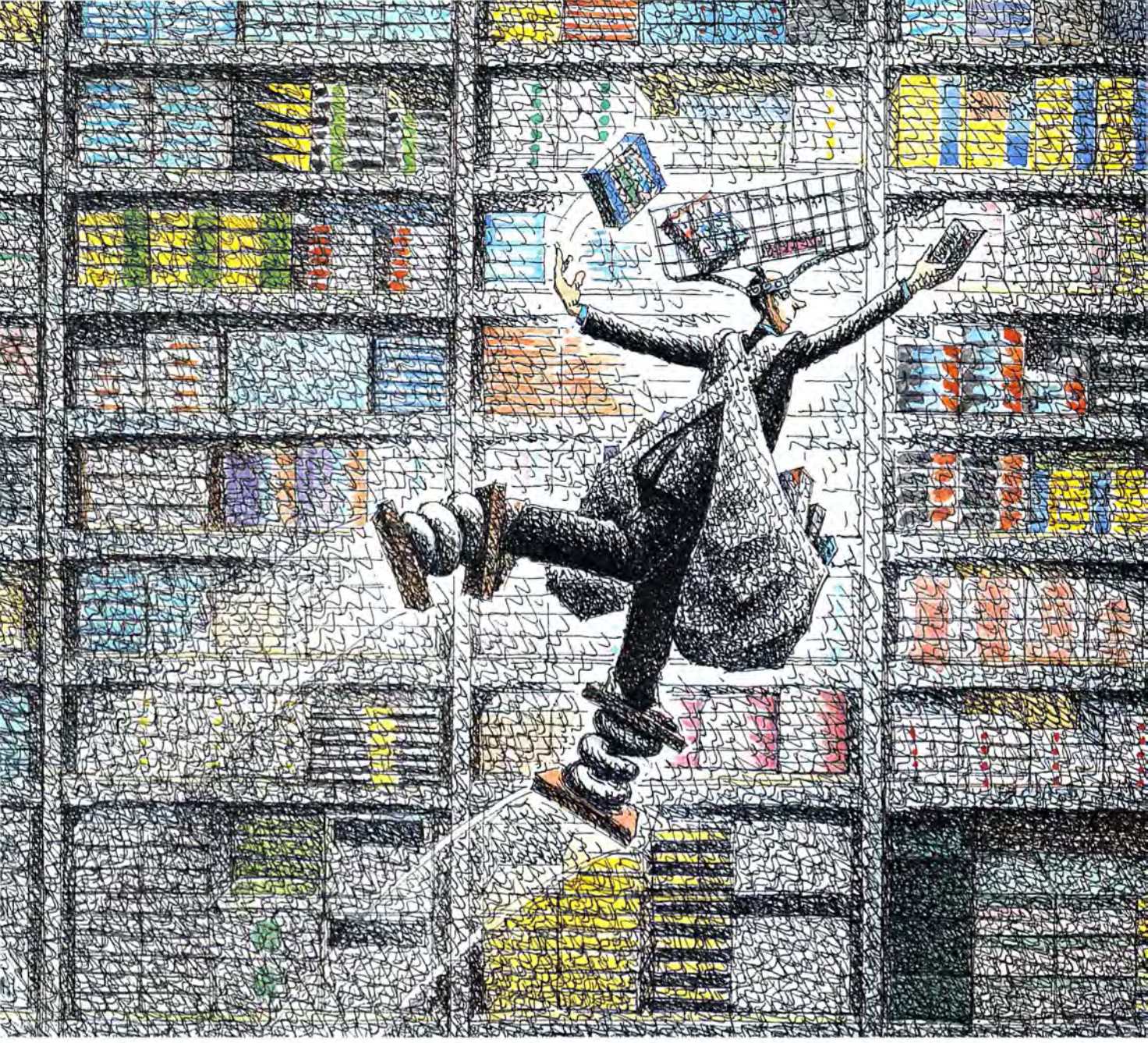
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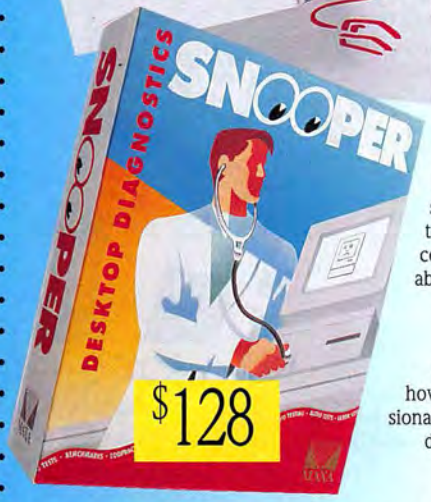
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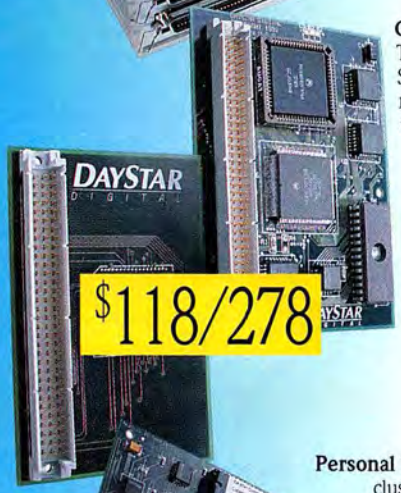
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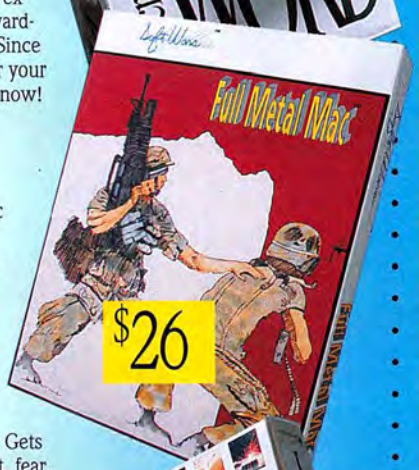
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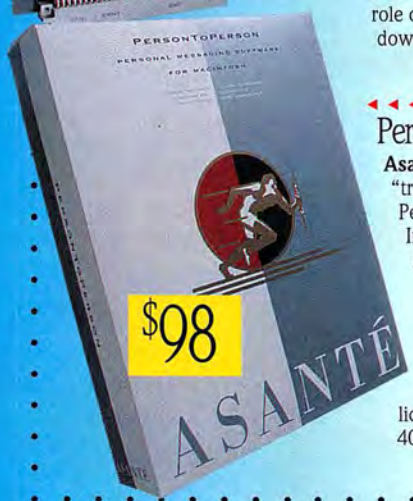
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- Competitive Upgrade ..... 94.

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- Wordscan ..... 188.

Ceres Software ○
- Inspiration 3.0.1 ..... 158.

CheckMark Software ○
- Cash Ledger ..... 112.
- MultiLedger 2.0 ..... 225.
- Payroll ..... 174.

Chena Software ○
- Fair Witness 1.1 ..... 315.

Claris
- Claris Works ..... 198.
- FileMaker Pro ..... 208.
- HyperCard V2.1 ..... 139.
- MacProject II V2.5 ..... 348.
- MacWrite II ..... 88.

CompuServe
- CompuServe Membership Kit . 25.
- CompuServe Navigator ..... 49.

Computer Associates ○
- Cricket Graph 1.2.3 ..... 84.

DeltaPoint ○
- DeltaGraph Professional ..... 198.

DiscTech Corp.
- Facilitator ..... 218.

Freesoft Company ○
- White Knight V11 ..... 85.

Insignia Solutions
- AccessPC ..... 59.
Soft PC
- Entry Level V2.5 ..... 125.
- Universal V2.5 ..... 194.
- AT V2.5 ..... 298.

Intuit ○
- Quicken 3.0 ..... 40.

JIAN
- BizPlanBuilder ..... 94.
- LivingTrustBuilder ..... 94.

Lotus Development
- Lotus 1-2-3 ..... 338.
- 1-2-3 Compet. Upgrade ..... 98.

Micro Planning Intl.
- Micro Planner Manager ..... 378.

Microsoft ○
- Excel 4.0 ..... 295.
- Office V2.0 ..... 478.
- Word 5.0 ..... 298.
- Works ..... 159.

New Era Software
- nuBASE Pro 1.5 ..... 248.
- dBASE to Pro 1.5 Upgrade ..... 128.

Nolo Press ○
- For The Record ..... 21.
- Will Maker 4.0 ..... 35.

Now Software ○
- Up to Date (1 User) ..... 64.
- Up to Date (5 User) ..... 258.

Paragon Concepts
- Nisus ..... 245.
- Nisus Compact ..... 98.

Pastel Development ○
- DayMaker ..... 58.

Portfolio Systems
- DynoDex 2.0 ..... 69.

Prescience
- Expressionist ..... 77.
- Theorist ..... 245.

Reality Technology ○
- Wealth Builder ..... 94.

SoftSync ○
- Accountant Inc. ..... 335.
- Accountant Inc. Multi-User ... 568.

Software Ventures ○
- MicroPhone II V4.0 ..... 208.

Spider Island Software ○
- TeleFinder Unlimited Ed. ..... 272.

SuperOffice Corp. ○
- SuperOffice 1 User ..... 228.

Symantec ○
- GreatWorks 2.0. ..... 198.
- More ..... 264.

T/Maker ○
- PowerBundle ..... 158.
- WriteNow 3.0 ..... 154.

Teleware ○
- M.Y.O.B. ..... 139.

Timeslips Corporation ○
- TimeSlips III V2.1 ..... 192.
- Accounting Link (TAL) ..... 52.

Westware ○
- Contact Ease V1.3 ..... 188.

Wolfram Research Inc. ○
- Mathematica Standard 2.0 ... 498.
- Mathematica Enhanced 2.0 .. 788.

WordPerfect Corp.
- WordPerfect V2.1 ..... 278.

WordStar
- American Heritage Dictionary . 55.
- Correct Grammar ..... 55.

Wyoming Software ○
- Business Sense 1.5 ..... 124.

GRAPHICS

Adobe
- Illustrator 3.2 w/ATM 2.0 ..... 368.
- Photoshop 2.0 ..... 548.
- Premier ..... 328.
- Streamline 2.0 ..... 117.
- Type Manager ..... 59.

Aldus ○
- Freehand 3.1 ..... 388.
- Gallery Effects ..... 128.
- Pagemaker 4.2 ..... 489.
- Personal Press 2.0 ..... 98.
- SuperPaint 3.0 ..... 128.

Altsys ○
- Fontographer 3.5 ..... 258.

Ares Software ○
- FontMonger ..... 59.

Broderbund
- Print Shop ..... 35.
- TypeStyler 2.0 ..... 128.

Calliscope Software
- Satellite 3D ..... 128.

Claris
- Claris CAD ..... 598.
- MacDraw Pro ..... 278.

Computer Associates
- Cricket Draw III ..... 168.

CoSA
- PACo Producer 2.0 ..... 158.
- PACo Producer Bundle ..... 374.
- XPLayPACo XCMD ..... 158.

D'pix ○
- FOLIO 1 ..... 344.

Delta Tao Software ○
- Monet ..... 198.

Deneba ○
- Canvas V3.0 ..... 248.

Fractal Design ○
- Painter 1.2 ..... 248.

Frame Technology
- FrameMaker ..... 594.

Macromedia
- MacroMind Director ..... 848.
- Magic ..... 248.
- Model Shop V2.0 ..... 598.
- Swivel 3D Professional ..... 468.

MicroFrontier ○
- Color It! ..... 75.

Motion Works
- PROmotion ..... 248.

PhotoDisc Inc. ○
- PhotoDisc Vol A or B ..... 198.

Pixar
- Showplace/MacRenderMan . 629.

Quark Incorporated
- XPress 3.1 ..... 558.

Ray Dream ○
- JAG ..... 78.
- Ray Dream Designer ..... 589.

Specular International ○
- Infini-D ..... 648.
- Replicas Vol. 1 or 2 ..... 188.

Strata, Inc.
- StrataVision 3D V2.5 ..... 628.

Timeworks
- Publish It! Easy ..... 145.
- Competitive Upgrade ..... 99.

Virtus
- WalkThrough ..... 298.

Vividus Corp
- Cinemation ..... 378.

CD-ROM

Agfa Corp.
- CD-ROM 3.0 Intro-Pack ..... 60.
- With CD-ROM Drive ..... 698.
Broderbund
- Just Grandma & Me ..... 35.

Cyan
- Cosmic Osmo CD ..... 39.

Discovery Systems
- Berkeley BMUG PD ROM ..... 65.
- Nautilus BackPac (1 or 2) ..... 44.
- Nautilus Starter Disc. ..... 20.

ICOM Simulations
- Sher. Holmes Consult. Det. ..... 45.

Optical Access ○
- CD/Allegro (310 ms) ..... 648.
- Access CD 6/Pak ..... 1198.
Optical Read/Write
- Access/MF Gigabyte ..... 2995.
- RD/Aria-128 MB ..... 1598.

Pixar
- Showplace/MacRenderMan . 448.

Quantum Leap
- CD-7 Super Library 2 Disk Set . 72.
- Giga-ROM 2.0-Super Library ... 98.
- Macademic-Education Library . 73.

EDUCATIONAL

Broderbund
- Kid Pix V1.2 ..... 37.
- Nigel's World ..... 36.
- Spelunx ..... 29.
- The Playroom V2.0 ..... 29.
- Type! ..... 18.

Compu-Teach
- Destination: MARS! ..... 38.
- Once Upon A Time-Vol. I-III ea. 34.

Davidson & Associates ○
- Alge-Blaster Plus ..... 36.
- Math Blaster Plus ..... 36.
- SAT Personal Trainer ..... 36.

Knowledge Revolution
- Interactive Physics ..... 156.

Learning Company ○
- Math Rabbit ..... 35.
- OutNumbered! ..... 36.
- Reader Rabbit 1 V3.0 ..... 35.
- The Writing Center ..... 50.

MECC ○
- Number Munchers ..... 28.
- Word Munchers ..... 28.
- Oregon Trail ..... 28.

Nordic Software ○
- Pre-Schoolpack ..... 35.
- Word Search Deluxe ..... 35.

Software Toolworks
- Mavis Beacon Typing ..... 29.

ENTERTAINMENT

Baseline Publishing ○
- Talking Moose ..... 22.

Broderbund
Carmen San Diego?
- Europe, Time, U.S.A, World ea.29.
- SimAnt ..... 35.
- SimCity ..... 29.
- SimCity Supreme ..... 47.
- SimEarth ..... 40.

Casady & Greene ○
- Glider ..... 29.

Deadly Games ○
- Battle of Britain II ..... 31.
- Bomber (w/Headphones) ..... 31.

Delta Tao Software ○
- Spaceward Ho! 2.0 ..... 35.
- Strategic Conquest 3.0 ..... 35.

DigiTek Software
- Hole-In-One Miniature Golf ..... 24.

Electronic Arts
- PGA Tour Golf ..... 35.
- Tournament Course Disk ..... 16.

Graphic Simulations
- HELLCATS Over The Pacific ..... 39.

Inline Design
- 3 in Three ..... 31.
- Darwin's Dilemma ..... 31.
- Mutant Beach ..... 42.
- Swamp Gas ..... 31.
- Tesserae ..... 31.

Lucasfilm Games
- Indiana Jones/Last Crusade ..... 32.
- Loom ..... 29.

Mallard Software
Flight Simulator Add-Ons
- Scenery Upgrade I-IV ..... ea.28.

MicroProse
- Railroad Tycoon ..... 40.

Microsoft ○
- Flight Simulator 4.0 ..... 39.

Sierra On-Line
- Space Quest IV ..... 37.

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Spectrum Holobyte
- 7 Tetris ..... 23.
- 7 Vette ..... 34.
- 7 WordTris ..... 24.

Strategic Simulations, Inc.
- 7 AD&D: Silverblades ..... 38.
- 7 AD&D:Curse of Azure Bonds ... 38.

Strategic Studies Group
- 7 American Civil War Vol 1 ..... 30.
- 7 Gold of the Americas ..... 30.
- 7 Panzer Battles ..... 28.
- 7 Reach for the Stars ..... 30.
- 7 Rommel Battles for N. Africa .. 28.
- 7 Warlords ..... 38.

Three Sixty Pacific
- 7 Harpoon ..... 39.
- 7 Harpoon BattleSet #2 or #3 .... 22.
- 7 Harpoon Scenario Editor ..... 26.

Velocity
- 7 Spectre ..... 38.
- 7 Spectre LAN PAK (3 Nodes) .... 58.

Virgin Games
- 7 Monopoly ..... 31.
- 7 Scrabble Deluxe ..... 31.

HARDWARE

Applied Engineering
- 7 AEHD Superdrive ..... 219.
- 7 FastMath LC(68882 16Mhz) .. 138.
- 7 Plus Drive ..... 308.
- 7 QuadraLink w/AE Shadow .... 199.
- 7 QuickSilver IIsi ..... 236.

TransWarp Accelerators
- 7 LC 33Mhz w/FPU ..... 998.
- 7 LC 40Mhz w/FPU ..... 1378.
- 7 LC 50Mhz w/FPU ..... 1498.
- 7 SE 25Mhz w/FPU ..... 788.

Asanté
- 7 10T Hub/8 ..... 258.
- 7 10T Hub/12 ..... 548.
- 7 MacCon3 IIsi ..... 248.
- 7 MacCon3 NB ..... 238.
- 7 MacCon3 SE ..... 248.
- 7 EN/SC ..... 328.
- 7 EN/SC PowerBook ..... 368.
- 7 EN/SC-10T ..... 258.
- 7 EN/SC-10T PowerBook ..... 288.

Caere
- 7 Typist + Graphics ..... 468.

Cayman Systems
- 7 GatorBox ..... 1949.

CoStar Corporation
- 7 LabelWriter II 1" Head ..... 188.
- 7 LabelWriter II Plus ..... 298.

Dayna Communications
- 7 DaynaPORT SCSI/Link PB ... 298.
- 7 DaynaPORT SCSI/Link-3 PB ... 348.
- 7 DaynaPORT SCSI/Link-T PB ... 298.
- 7 DL/2 ..... 288.
- 7 DL2000 ..... 218.
- 7 EtherPrint-T ..... 338.
- 7 EtherPrint-T Plus ..... 598.

DaynaPORT Ethernet Cards
- 7 E/II ..... 148.
- 7 E/II-T ..... 148.
- 7 E/si-T ..... 148.
- 7 E/si-TFP ..... 248.
- 7 E/ZT (External) ..... 278.

DayStar Digital
- 7 ComboCache IIsi ..... 248.
- 7 ComboCache IIsi w/FPU ..... 328.
- 7 DualPort IIsi w/FPU ..... 168.
- 7 Equalizer LC ..... 198.
- 7 Equalizer LC w/FPU ..... 278.
- 7 Fast Cache 040 ..... 358.
- 7 PowerMath LC ..... 118.
- 7 SCSI Powercard (0MB RAM) 1048.

PowerCache(SE/30, all IIs, and LC)
- 7 33Mhz ..... 698.
- 7 40Mhz ..... 858.
- 7 40Mhz w/FPU ..... 1098.
- 7 50Mhz ..... 1358.
- 7 50Mhz w/FPU ..... 1589.

Dove
- 7 DoveFax Desktop V2.0 ..... 198.
- 7 DoveFax Desktop Plus V2.0 ... 268.
- 7 DoveFax LE ..... 138.
- 7 DoveFax PB-PowerBook ..... 196.

DoveFax LAN
- 7 5, 10, 20, 30, or 50 User ..... Call.

E-Machines

Color Displays
- 7 ColorPage E16 ..... 1045.
- 7 ColorPage T16 ..... 1398.
- 7 ColorPage T16II ..... 1698.

Color Interface Cards
- 7 DoubleColor ..... 328.
- 7 DoubleColor LC ..... 395.
- 7 Futura EX ..... 568.
- 7 Futura SX ..... 878.
- 7 Futura SX/8 ..... 698.
- 7 Futura MX ..... 1298.

Ethernet-24-Bit Color
- 7 ColorLink EX/T ..... 658.
- 7 ColorLink SX/T ..... 998.

Everex
- 7 EMAC 150-MB Tape BU. ..... 678.

Farallon

PhoneNET
- 7 Connectors Din 8 ..... 29.
- 7 Connector (10Pk) Din 8 ..... 195.

Global Village

TelePort
- 7 2400 with MNP5 ..... 128.
- 7 Fax 9600 (Send Only) ..... 179.
- 7 Full Fax Send/Receive ..... 228.
- 7 PowerPort/V.32 PowerBook .. 488.

Harris Labs

Performer
- 7 16 Mhz Accel. ..... 239.
- 7 16 Mhz Accel.w/FPU ..... 318.

Logicode

Fax Modems-Send/Receive
- 7 9624 ..... 148.
- 7 9624 V.42bis ..... 198.
- 7 9696 V.42bis ..... 398.
- 7 14,400 V.42bis ..... 458.

Quicktel Modems
- 7 14,400 V.32bis,V.42bis,MNP5 418.

Micron
- 7 XCEED Gray-Scale 30 ..... 78.
- 7 XCEED Color 30 ..... 279.
- 7 XCEED MacroColor II ..... 469.
- 7 XCEED MacroColor 30 ..... 488.

Microtek
- 7 ScanMaker 600GS ..... 848.
- 7 ScanMaker 600ZS ..... 1398.
- 7 TrueLaser Printer ..... 1398.

RasterOps

Color Monitors
- 7 16" ..... 1288.
- 7 19" Hitachi ..... 1698.

24-Bit Color Video 13",19",21"
- 7 24MX ..... 1288.
- 7 24MXQ ..... 1288.
- 7 24Sx ..... 648.
- 7 24XLI ..... 2148.
- 7 PaintBoard 24 ..... 1698.

Monochrome/Grayscale Monitors
- 7 19" Mono/Gray-Scale ..... 858.

Video Boards-Monochrome
- 7 ClearVue/XL ..... 348.

Video & Multi Media
- 7 Expresso Pers. Slide Scan. .... 698.
- 7 24STV ..... 828.
- 7 MediaTime ..... 1698.
- 7 VideoTime ..... 1288.
- 7 Video Expander ..... 498.

Seiko
- 7 Seiko CM 1445 14" Trinitron . 590.

Shiva
- 7 Ethergate ..... 1289.
- 7 FastPath 5 ..... 1888.
- 7 NetBridge ..... 398.

SIMM

PowerBook Memory 140/170
- 7 4-MB Psuedo-Static ..... Call.
- 7 6-MB Psuedo-Static ..... Call.

Single Inline Memory Modules
- 7 SIMM 1-MB 80ns ..... 35.
- 7 SIMM 2-MB 80ns ..... 69.
- 7 SIMM 4-MB 80ns ..... 128.
- 7 SIMM FX 4-MB 80ns ..... 148.
- 7 SIMM FX/NTX 1-MB 80ns ..... 42.

SuperMac
- 7 Monochrome Card ..... 358.
- 7 PowerBook Display Expander 538.
- 7 SuperMatch Calibrator ..... 538.

8 Bit Display Cards
- 7 Spectrum/8 LC ..... 538.
- 7 Spectrum/8 Series III ..... 538.
- 7 Spectrum/8 si ..... 538.

24 Bit Display Cards
- 7 ColorCard/24 ..... 538.
- 7 Spectrum/24 ..... 1078.
- 7 Spectrum/24 Series III ..... 1528.
- 7 Spectrum/8•24 PDQ ..... 898.
- 7 Spectrum/8•24 PDQ si ..... 898.

Monochrome/Greyscale Monitors
- 7 ColorCard Accelerator ..... 358.
- 7 Spectrum/24 Accelerator ..... 448.

SuperMatch Color Monitors
- 7 17" Multimode Color ..... 1138.
- 7 20" Color ..... 1898.
- 7 20" Dual-Mode Trinitron ..... 2698.

Multimedia/Video Spigot
- 7 Spigot & Sound NuBus ..... 798.
- 7 Spigot & Sound Pro NuBus . 1698.
- 7 Spigot LC ..... 448.
- 7 Spigot NuBus ..... 538.
- 7 Spigot Pro NuBus ..... 1438.
- 7 Spigot si ..... 448.
- 7 Spigot Pro si ..... 1348.
- 7 SuperSqueeze ..... 798.

Supra Corp.

Supra FaxModem
- 7 FaxModem Plus MacPac ..... 198.
- 7 FaxModem V.32 ..... 252.
- 7 FaxModem V.32bis ..... 322.

Supra Modem
- 7 2400 ..... 109.
- 7 MacPac 2400 ..... 138.
- 7 MacPac 2400 w/MNP 5 ..... 198.
- 7 Plus 2400 (MNP5,V.42 BIS) ... 158.

Thunderware
- 7 LightningScan Pro 256 ..... 489.

UMAX Technologies Inc.
- 7 UC 630 ..... 1398.

Wacom

12X12 Digitizers Cordless Stylus
- 7 Standard ..... 758.
- 7 Electro Static ..... 836.

6 X 9 Digitizers Cordless Stylus
- 7 Standard ..... 518.

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Internal Hard Drives
- 7 DP+ 52-MB Quantum ..... 268.
- 7 DP+ 105-MB Quantum ..... 398.
- 7 DP+ 240-MB Quantum ..... 758.
- 7 DP+ 425-MB Quantum ..... 1298.

Removable Syquest Hard Drives
- 7 DP+ 44-MB w/cartridge ..... 508.
- 7 DP+ 88-MB w/cartridge ..... 698.
- 7 44-MB Cartridges ..... 68.
- 7 88-MB Cartridges ..... 107.

Accessories
- Mounting Bracket (IIcx/IIci) ..... 19.
- Case Opener/Torex Kit ..... 8.

FWB Software

PowerBook Hammer
- 7 Hammer PB60 ..... 638.
- 7 Hammer PB80 ..... 788.
- 7 Hammer PB120 ..... 868.

PocketHammer
- 7 50-MB ..... 568.
- 7 100-MB ..... 768.
- 7 200-MB ..... 1198.

Iomega

Bernoulli
- 7 Transportable 90-MB ..... 698.
- 7 Kit w/MacTools Deluxe ..... 38.
- 7 Kit w/Retrospect ..... 98.
- 7 Single 90-MB Cartridge ..... 139.
- 7 Tri-Pack 90-MB ..... 418.

Quantum Drives
- 7 ProDrive LPS 52-MB ..... 248.
- 7 ProDrive LPS 105-MB ..... 378.
- 7 ProDrive 240-MB ..... 738.
- 7 ProDrive 425-MB ..... 1278.

Seagate Technology

Full Height Drive
- 7 WrenRunner II 676-MB ..... Call.

MUSIC

Ars Nova
- 7 Practica Musica 2.3 ..... 68.

Opcode Systems
- 7 Book Of MIDI ..... 28.
- 7 EZ Music Starter Kit ..... 178.
- 7 EZVision ..... 98.
- 7 Galaxy Universal Librarian .... 188.
- 7 MIDI Translator ..... 42.
- 7 Studio 3 MIDI/Smpte Intfc. .... 288.
- 7 Vision ..... 368.

Passport Designs
- 7 MIDI Interface ..... 78.

PROGRAMMING

Bowers Development
- 7 AppMaker 1.5 ..... 214.

Microsoft
- QuickBASIC 1.0 ..... 68.

Symantec
- 7 Just Enough Pascal ..... 51.
- 7 THINK C 5.0 ..... 198.
- 7 THINK Pascal 4.0 ..... 159.
- 7 THINK Reference ..... 69.

TGS Systems
- 7 Prograph V2.5 ..... 298.

Userland Software
- 7 Frontier 1.0 198

Zedcor Inc
- 7 ZBasic 5.0 ..... 95.

BOOKS

Addison Wesley
- Guide to Mac Family Hdw. ..... 21.
- Mac C Prog. Vol 1 or 2 ..... 19.
- Mac Pascal Prog. Vol 1 ..... 19.
- Macintosh Program Secrets .... 18.

Inside Out Series
- Complete Book of HyperTalk 2 19.
- 7 Learn C w/Thin C Lite ..... 28.
- Mac Prog Guide MPW Vol 1 ... 19.
- 7 ResEdit Complete w/ResEdit .. 23.

Bantam Books
- HyperCard Handbook ..... 21.

Microsoft Press
- MS Excel 3 Companion ..... 20.

Peachpit Press
- Canned Art 2 ed.:Clip Art/Mac 24.
- Canvas 3.0: The Book ..... 14.
- 7 DataBase 101 W/ Demo Disk . 14.
- DTP Survival Kit ..... 18.
- Little Mac Book, 2nd ed. ..... 12.
- Little Mac Word 5 Book ..... 14.
- Little QuicKeys Book ..... 12.
- Little System 7 Book ..... 10.
- Macintosh Font Book ..... 18.
- PM 4:An Easy Desk Ref. ..... 24.
- QuarkXPress Book ..... 20.
- Real World Freehand ..... 22.

Ventana Press
- 7 System 7 Book w/Disk ..... 24.
- 7 System 7 Companion Disks ..... 12.

UTILITIES

Aladdin Systems
- 7 StuffIt Deluxe 2.0 ..... 59.

Alsoft
- 7 DiskExpress II ..... Call.
- 7 MasterJuggler ..... 28.
- 7 Power Utilities ..... 62.

Alysis Software
- 7 More Disk Space ..... 48.
- 7 SuperDisk! 2.0 ..... 54.

ASD Software
- 7 FileGuard 2.7 1 User ..... 129.

Asanté
- 7 PersonToPerson 10-User ..... 262.
- 7 PersonToPerson Zone Pack .. 458.

Berkeley Systems
- 7 After Dark 2.0 ..... 28.
- 7 More After Dark (M.A.D.) ..... 23.
- 7 After Dark & M.A.D. Bundle ... 39.

Casady & Greene
- 7 Crash Barrier ..... 48.

CE Software
- 7 Disktop 4.0 + Gofer & Util ..... 62.
- 7 QuicKeys 2.1 ..... 89.

QuickMail 2.5
- 7 5 Users ..... 239.
- 7 10 Users ..... 365.

Connectix
- 7 HandOff II 2.2 ..... 55.

Custom Applications
- 7 Freedom of Press Lite ..... 58.

Dantz Development
- 7 DiskFit Pro ..... 69.
- 7 Retrospect ..... 145.

Dayna Communications
- 7 DOS Mounter V3.1 ..... 54.

Farallon
- 7 Timbuktu 4.0 ..... 128.
- 7 Timbuktu Remote 3.0 ..... 129.

Fifth Generation
- 7 FastBack Plus ..... 118.
- 7 Suitcase V2.0 ..... 49.
- 7 SuperLaserSpool ..... 98.

FWB Software
- 7 Hard Disk Toolkit ..... 126.

Information Electronics
- 7 QMConcierge ..... 168.

IBS
- 7 Data Club Classic 3 Pak ..... 179.
- 7 Data Club Classic 10 Pak ..... 498.
- 7 DataClub Elite ..... 938.

Kent Marsh
- 7 FolderBolt ..... 69.
- 7 NightWatch II ..... 89.

MAXA Corporation
- 7 Snooper ..... 128.
- 7 Snooper Kit w/board ..... 168.

Microcom
- 7 Virex ..... 59.

MicroMat
- 7 MacEKG 2.0 ..... 98.

Now Software
- 7 Now Utilities V 3.0 ..... 83.

Sabastian Software
- 7 Image Grabber 3.0 ..... 35.

Salient
- 7 AutoDoubler ..... 45.
- 7 DiskDoubler ..... 45.

Software Architects Inc.
- 7 Hard Drive Tune-Up ..... 59.

Sound Source Unlimited

SoundWare
- 7 Star Trek Sounds Vol. 1 or 2 .... 29.

Symantec
- 7 Norton Utilities 2.0 ..... 99.
- 7 S.A.M.III ..... 64.

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- 7 Help! ..... 89.

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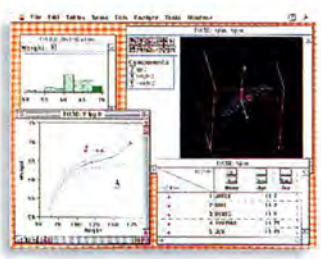


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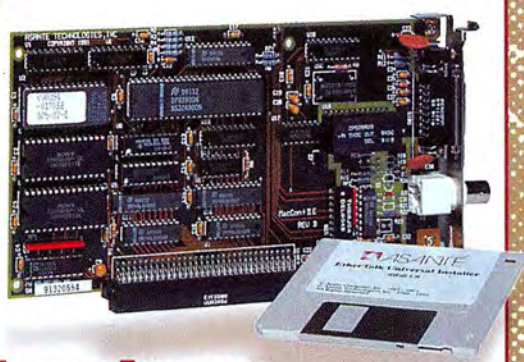
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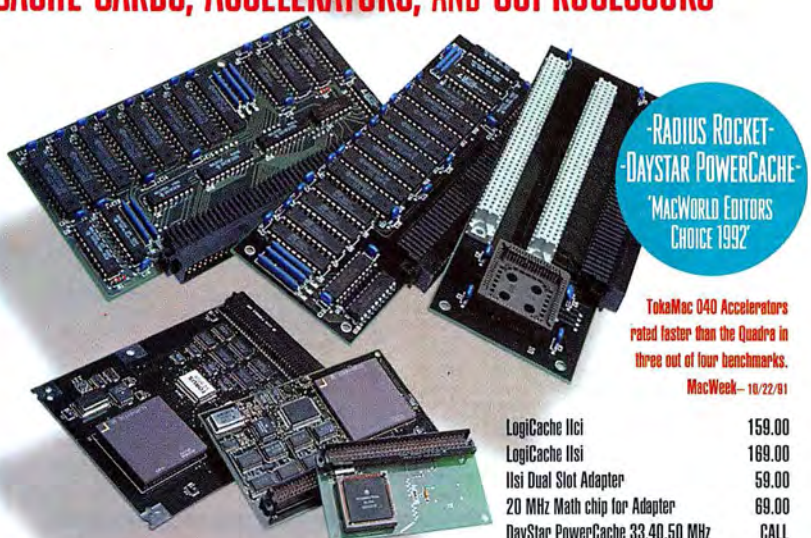
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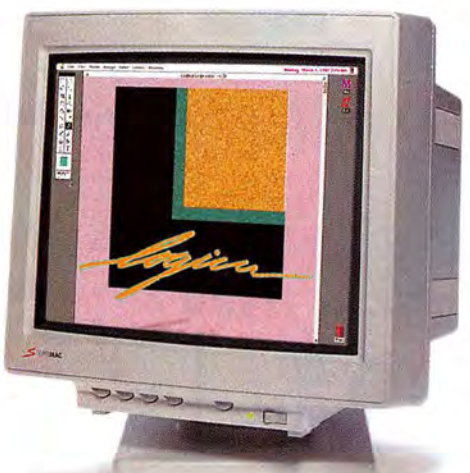


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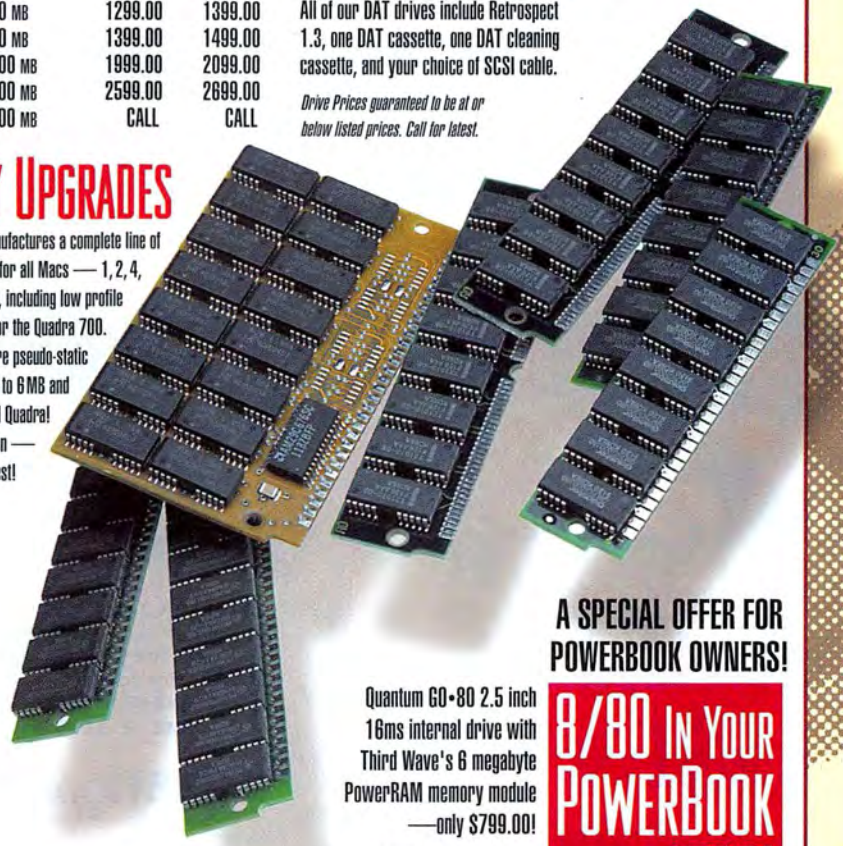
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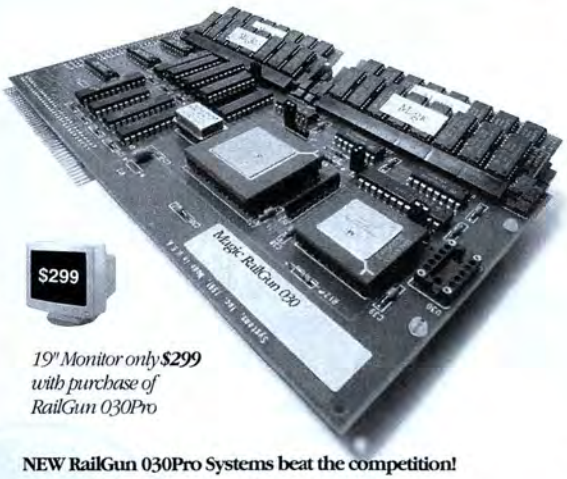
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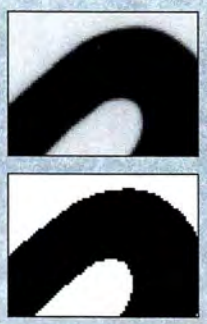
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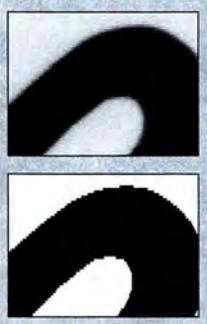
Microtek 600ZS
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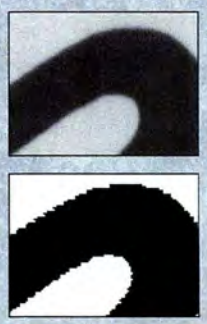
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La Cie Silverscanner
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Just look at the difference in the color scans. The single-pass Silverscanner has three separate noble gas-filled lamps for red, blue and green that are balanced so you get great scans the first time. With Silverscanner's built-in gamma correction, you get clean, bright scans with excellent detail in those hard-to-get areas that don't require difficult adjustment like other scanners. This can mean substantial time savings when every second counts.

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La Cie Silverscanner with Color It

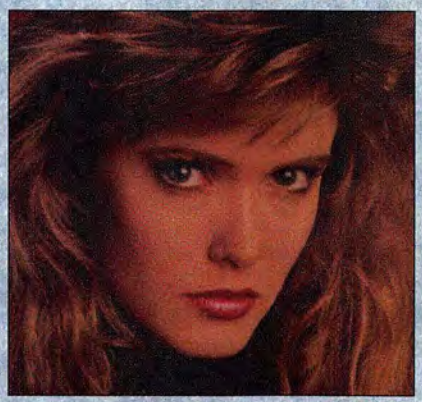
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Howtek Scanmaster 3 $8195**



La Cie Silverscanner $1,399



Microtek 600ZS
1200 dpi at 400%—n/a



Howtek Scanmaster 3
1200 dpi at 400%—n/a

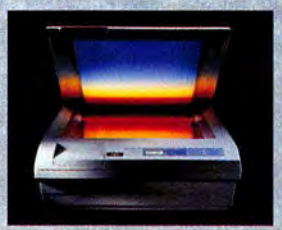


La Cie Silverscanner
1200 dpi at 400%



La Cie Silverscanner
1200 dpi at 100%

All scans were done at default settings with no corrections. The color images were separated using Adobe Photoshop. The logo was scanned as grayscale and as line art. This entire ad was done on the Macintosh using Silverscanner, Photoshop, Quark XPress and a PostScript Imagesetter. The entire production cost was $145.



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Silverscanner is OCR and Apple System 7 compatible and can be purchased with full versions of Adobe Photoshop ***and*** Fractal Design's ColorStudio— a $2139 value for only $1899!

La Cie Silverscanner with Photoshop and ColorStudio

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Macworld, June 1991

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ExpressDrive	$Call
Silverscanner	$1399
Silverlining	$149

Call for products not listed.

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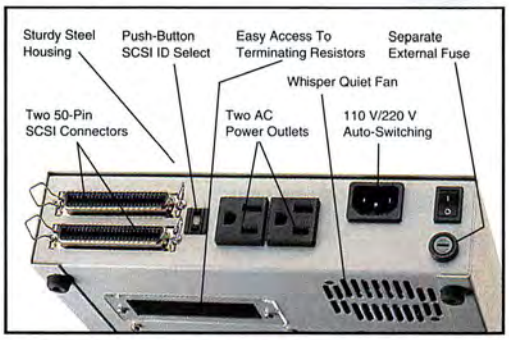


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420mb	(406) 14ms	$1199	$1259
645mb	(634) 11.9ms	$1615	$1715
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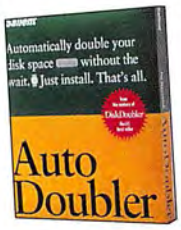


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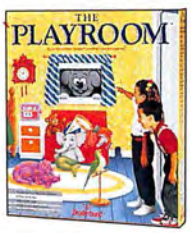
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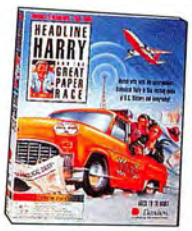
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297-302

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303-321

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A forum for innovative, unique, low-cost and hard-to-find Macintosh hardware, software, and miscellaneous products and services.

322-323

Product Categories

	Premier	Classified	BusinessCard
Hardware			
Accelerator Boards	297	303	
Bar Coding		303	
CD-Rom			
Communications	297		
Computer Systems	297	303	322
Data Acquisition			
Data Recovery Services	297	308	322
Disk Drives	298	308	
Diskettes			
General		308	
Input Devices			
Insurance		308	322
Memory Upgrades		309	
Networking			
Peripherals		312	
Power Supplies		315	
Printers		316	
Scanners		316	
Security			
Used Equipment			
Software			
Accounting	299		322
Bar Coding	299	316	
Business	300	316	322
Business Time Management			
CAD/CAM		316	
CD-Rom	300	317	
Communications/Networking		318	
Desktop Publishing	300	318	
Educational		318	
Emulation			
Engineering		318	
Entertainment/Games	300	318	322
Financial			
Fonts		318	
Foreign Language	300	319	
Genealogy		319	
General			322
Government			
Graphics	300	319	323
Health		319	323
Language Tools		320	
Legal			
Lottery			
Medical/Dental			323
Music/MIDI	301		
Networking			
Personal Management			
Programming Tools	301		
Public Domain		320	
Real Estate			323
Recreation			323
Religion			
Sales Marketing			
Scientific		320	323
Security			
Shareware	301	320	
Stackware			
Statistics			
Taxes			
Utilities	301		323
Word Processing			
Miscellaneous			
Accessories	302	320	
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Business Opportunities			
Consulting/Programming			
Data Conversion Services		320	
Desktop Publishing Services		320	
Diskette Copy Services		320	
Furniture			
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Novelties			
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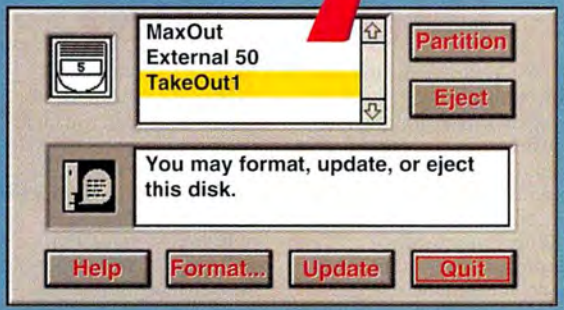
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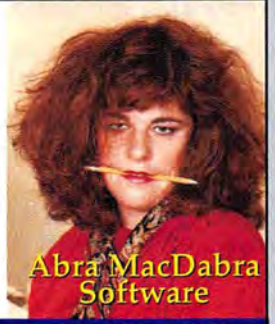
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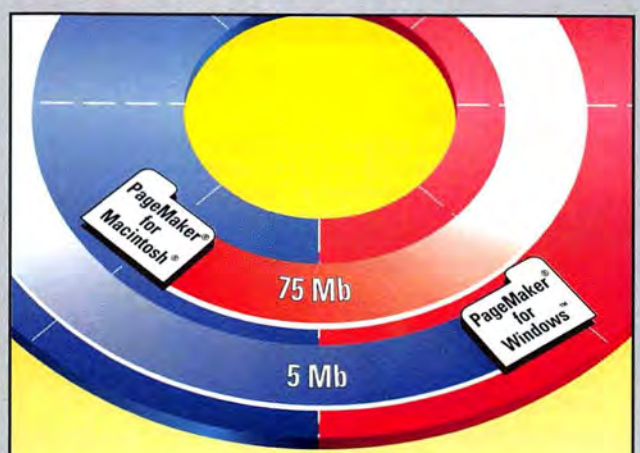
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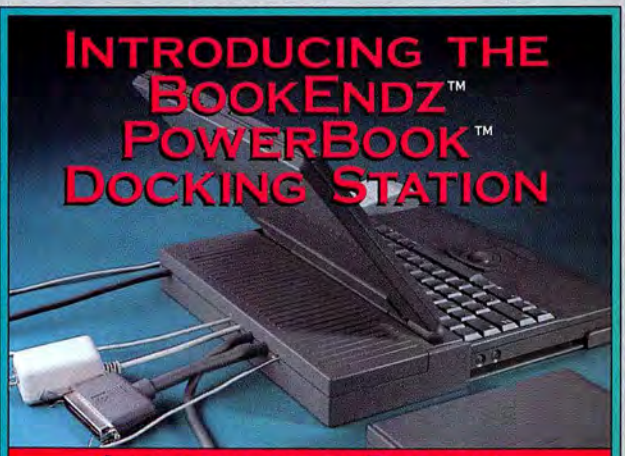
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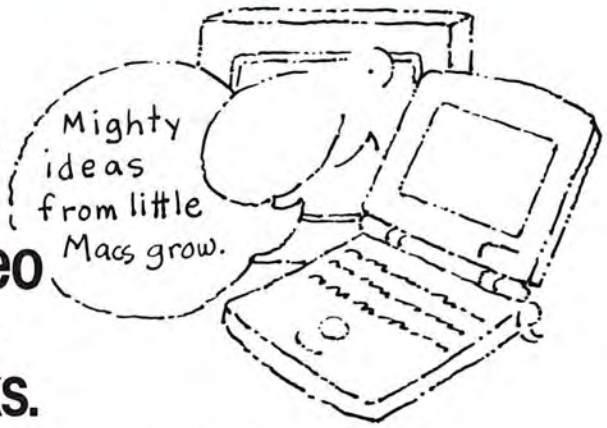
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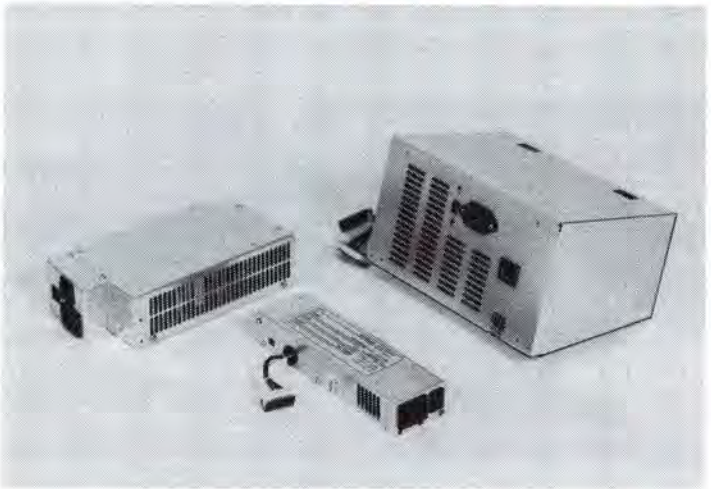
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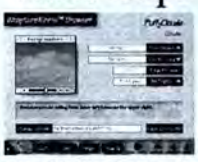


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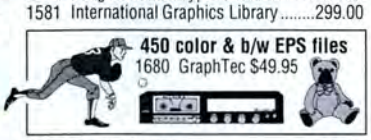
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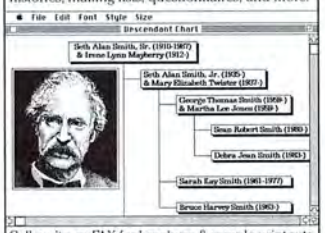
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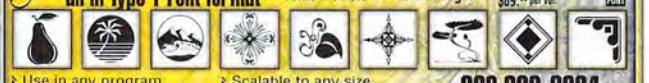
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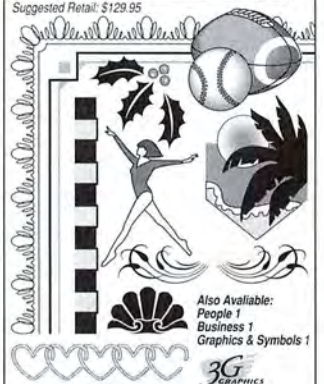
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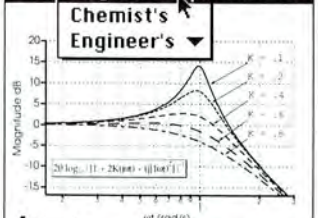
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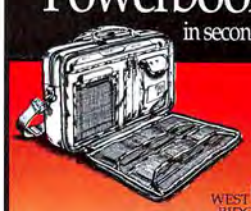
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MacUser MARKETPLACE

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Win'ers and Losers



It's all over but the shouting in the epic Apple/ Microsoft lawsuit. Can Bill Gates make sure your next Mac is a Windows machine?



So how did you feel when you heard the news that Microsoft beat Apple in the Apple-versus-Microsoft lawsuit? When Apple seemed to be winning, it looked as though this suit was the only thing that could prevent Microsoft from steamrollering the entire software business.

Here comes the steamroller.

It was a weird suit, with Apple claiming that Microsoft's Windows infringed on Apple's proprietary Mac look and feel. Over the years, depending on your attitude toward either Microsoft or Apple, you'd root for one side and then the other. I guess this fun couldn't drag on forever.

As you might recall, the suit began over the supposed breach of a 1985 agreement between Microsoft and Apple that gave Microsoft the right to use some aspects of the Mac's look and feel in its then-new Windows environment. According to one account, the agreement was reached in the first place only because of John Sculley's inability to say no to Bill Gates, who threatened to stop all Mac development at a critical moment if Apple stood in his way. Good timing for Mr. Bill, because the future of the Mac wasn't all that certain. So Sculley caved in. Apple would later sue, saying that version 2 of Windows wasn't covered by the agreement, as if the number somehow meant something. Was Apple's original intent to give Microsoft a license for something that could never be upgraded or improved? What kind of a deal is that?

On the other hand, why would Apple give anyone such a license if the intention of the licensee was to create a Mac look-alike that would run on a cheap PC platform? The licenser might as well put a gun to his own head.

This all became beside the point when the case degenerated into a look-and-feel suit. And now, if Borland can follow Microsoft's lead by beating Lotus in a similar suit across town, it appears that this kind of case will go the way of the dodo.

What I hate to see is the already arrogant Microsoft given yet another opportunity to gloat and snicker over the inability of *anyone* to successfully challenge the company in any way. Still, it seems that the right side won.

In fact, the entire screen-copyright and look-and-feel concept really sucks. We don't need this kind of limitation on developers, who traditionally have built new ideas on past ideas. The Mac screens were predated by Xerox's, and everyone knows it. Xerox didn't beat Apple in a suit, so why should Apple beat Microsoft?

Another overlooked aspect to all this is that Apple was actually one of the earliest promoters of the litigious tactic of suing every bastard who looked cross-eyed at the company. This was especially true during the Apple II glory days, when hapless low-budget bozos were bringing in the odd Apple II clone from Taiwan. I recall one poor sap being blasted by both barrels from the Apple legal war room. The guy brought in a couple of Pineapple computers or some other crappy clone, and the next thing you know, he was in court, soon to be financially ruined for offering a cost-effective alternative to the then-pricey Apple II. This scenario repeated itself again and again — as if any one of those two-bit operators were actually a threat to Apple.

Anyway, except for some possible appeals, we can assume that Microsoft will go merrily off and push its agonizing Windows product into the cheap-clone arena — with some sales at Apple's expense.

What, Me Worry?

I don't think that any of this will really hurt Apple, though. Smart money that can afford to buy the Apple Mac will always prefer it to the PC. Because Microsoft is showing every indication of becoming more and more greedy, we can expect it to so dominate the PC software business that the premium paid for the Apple alternative may not be all that high. Let's face it, there is a lot of second-rate software running on the PC, especially when compared with software running on the Mac. Take TrueType (please!), and compare it with PostScript output. TrueType looks dreadful.

Because I write for both *PC Magazine* and *MacUser*, I get mail from both camps. Before Windows, I could easily tell at a glance which letters came from PC users and which came from Mac users. Although now PC users have real fonts too, I still won't have any trouble telling which letters are theirs. The situation may shift, but it won't change.

After the dust clears from this suit, that's the way the business will be for Apple and the cloners. The situation will shift, but it won't really change. Except, that is, for all that damned snickering you'll hear up in Redmond.

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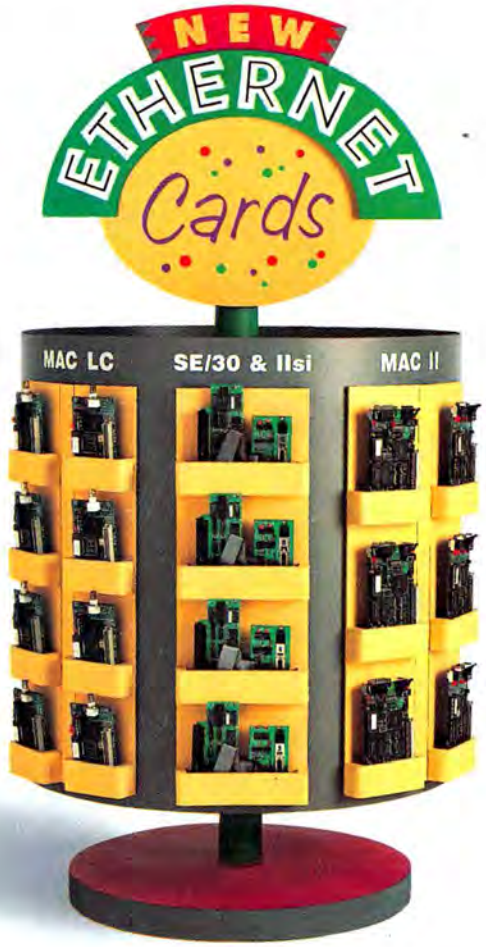
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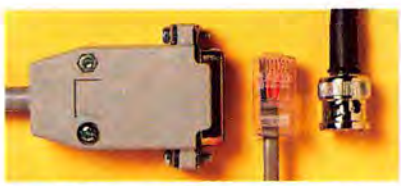
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